Managed 8-port 10/100 Mbps
plus 1-port 100-FX
Access Switch

NSH-5509

User Manual

(December 2007)

VOLKTEK
Optical Ethernet Experts

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CE

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Take special care to read and understand all the content in the warning boxes:

Warning

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1 About This Guide

1.1 Welcome

Congratulations on choosing the NSH-5509 Managed 8-port 10/100Base-TX + 1-port 100-FX Access Switch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet switching technologies with versatile management capabilities in a highly flexible package. The device provides various management interfaces – including Web, serial Console, Telnet, and Command Line (CLI).

1.2 Purpose

This guide discusses how to install and configure your Managed Access Switch.

1.3 Terms/Usage

In this guide, the term “Switch” (first letter upper case) refers to the NSH-5509 Switch, and “switch” (first letter lower case) refers to other switches.

1.4 Features

- Eight (8) 10/100Base-TX, one (1) 100Base-FX, and one (1) Console port (RJ-45)
- SNMP management application software (HP Open View and IBM/Tivoli NetView capable)
- Http/Web browser user interface, CLI interface via console and telnet
- Xpress Ring (redundant ring) with less than 50ms recovery time
- Auto-negotiation NWay on copper Ethernet ports
- Remote & local management
- Extends fiber distances to 2km for multi-mode and up to 120km for long-haul single-mode fiber
- WDM Single fiber optics
- Status LEDs for quick and easy network activity monitoring
- Firmware upgradeable
- Console Port (RJ-45) for out-of-band device management. Configure the device through a Terminal Emulator /TELNET Program
- RJ-45 Ethernet Ports support auto MDI/MDI-X
- Fiber Port: connect various fiber optic cables (multi-mode, single-mode, long-haul single-mode, and WDM) to the fiber port
- VLAN port isolation function to isolate downlink ports of a VLAN group, making the Switch suitable as a remote access switch for cases where the operator needs to service an MTU/MDU (Multiple Tenant Unit and Multiple Dwelling Unit – for example an apartment building)
- Port-based MAC limitation to restrict the number of MAC addresses learned on each port – improves network security

- FCC Class A & CE approved

1.5 Specifications

Standards:
IEEE 802.3 (10BASE-T Ethernet)
IEEE 802.3u (100BASE-TX Fast Ethernet)
IEEE 802.3x Flow Control
IEEE 802.3ad Port Trunking
IEEE 802.1d STP
IEEE 802.1w RSTP
IEEE 802.1q VLAN
IEEE 802.1p Priority Queues

Connectors:
1 x 100Base-FX (SC/ST)
8 x RJ-45 (10/100Mbps)
1 x RJ-45 (Console Port)

Management:
Out-of-band management via Console Port (RJ-45)
In-band management via RJ-45 and fiber ports

Cable Types:
UTP: (Cat 5/5e.)
Fiber: Multi-mode (62.5/125 micron)
Single-mode (9/125 micron)

Max. Distances:

Copper:	100 meters (Category 5/5e.)
Fiber:	2,000 meters (multi-mode)
	Up to 120,000 meters (single mode)

Data Rates:

Ethernet	10Mbps
Fast Ethernet	100Mbps

Physical Characteristics

Power:
Power Input: 100~240V AC
-48VDC
+12VDC

Environment:
Operating:
Temperature: 0˚C to 50˚C
Relative Humidity: 10% to 80%, non-condensing

Non-Operating / Storage:
Temperature: -20˚C to 80˚C
Relative Humidity: 5% to 90%, non-condensing

Emissions: FCC Part 15 of Class A & CE approved

Dimensions: Dimensions 128 x 268 x 44 mm (D x W x H)

Safety: EN 60950

Weight: 1200g

1.6 Package Contents

The package should include the following:

- One Managed Access Switch
- One console port cable (RJ45 to DB9)
- Protective caps for unused ports
- Four self-adhesive pads
- One AC power cord (optional adapter)
- User Manual CD

2 Hardware Description

The Switch was specially developed with a host of features that makes it particularly suited for SOHO applications that demand the utmost in reliability. The Switch was developed with “Xpress Ring” features. Xpress Ring offers recovery time of less than 50ms in case of network-link failure. This makes the Switch particularly suited for applications that require super-fast recovery times and maintenance of service, ensures "always-on" connectivity, eliminating costly network downtime.

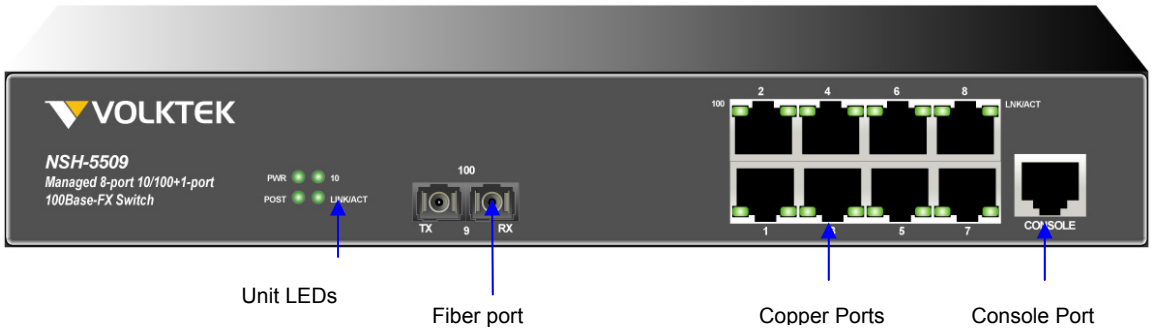
Being SNMP-ready, the Switch enables network managers to remotely monitor the entire network’s status quickly and easily via a network port, or a console port (out-of-band) connection. The Switch is designed with 'plug-n-play' features for hassle-free integration into today's managed mixed-cabling network configurations, minimizing your troubleshooting time.

Featuring Auto MDI/MDI-X detection for direct connection to a workstation, switch or hub, network managers no longer need to worry about the cable configuration (cross-over or straight through) when establishing connections between RJ-45 ports.

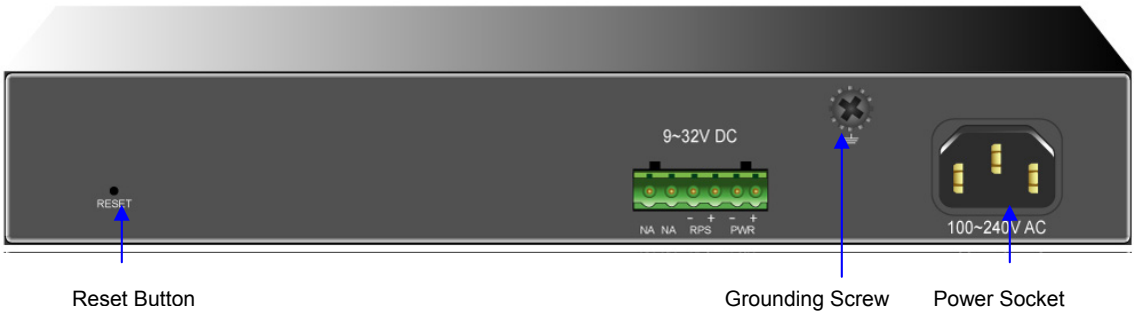
The Switch has auto-negotiation capabilities that allow it to support connection with leading NWay switches.

2.1 Product Illustration

Front view of Switch:



Rear view of Switch:



2.2 Connectors

The Switch utilizes ports with copper and fiber port connectors functioning under Ethernet/Fast Ethernet standards.

2.2.1 10/100Base-TX Ports

The 10/100BASE-TX ports support network speeds of either 10Mbps or 100Mbps, and can operate in half- and full-duplex transfer modes. These ports also offer automatic MDI/MDI-X crossover detection that delivers true “plug-n-play” capability – just plug the network cables into the ports and the ports will adjust according to the end-node devices. The following cabling is recommended for the RJ-45 connectors: (1)10Mbps – Cat 3 or better; (2)100Mbps – Cat 5 or better.

2.2.2 100Base-FX Port

The 100Base-FX port adds a fiber Fast Ethernet link to your network device. Compliant with IEEE 802.3u, this port can transmit data at 100Mbps in full-duplex mode across distances of up to 2km (with multi-mode) and up to 120km (with single-mode fiber-optic cable). The fiber ports have a choice of 2 fiber connector types: ST and SC.

3 Installation

The location chosen for installing the Switch may greatly affect its performance. When selecting a site, we recommend considering the following rules:

- Install the Switch in an appropriate place. See Technical Specifications for the acceptable temperature and humidity ranges.
- Install the Switch in a location that is not affected by strong electromagnetic field generators (such as motors), vibration, dust, and direct sunlight.
- Leave at least 10cm of space at the front and rear of the unit for ventilation.
- Affix the provided rubber pads to the bottom of the Switch to protect the case from scratching.

3.1 Desktop installation

Follow the instructions listed below to install the Switch in a desktop location.

1. Locate the Switch in a clean, flat and safe position that has convenient access to AC power.
2. Separate the four (4) self-adhesive rubber pads and attach them to the underside of the Switch.
3. Apply AC power to the Switch. (The green PWR LED on the front panel should light up).
4. Connect cables from the network partner devices to the ports on the front panel. (The green LNK LED on the front panel associated with the port should light).

This Switch can also be mounted on a vertical surface. Simply use the underside of the unit as a template to measure and mark out the position of the holes on to the surface where the unit is to be installed. Then use the two screws provided to mount the Switch firmly in place.

Warning: Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.

3.2 Mounting on a rack

Attach brackets to each side of the switch and place the brackets in the rack's slots. Insert and tighten two screws to securely attach the bracket to the rack on each side.

3.3 Getting Connected

The Switch is capable of connecting up to 9 network devices employing a combination of twisted-pair and fiber cabling paths at Ethernet or Fast Ethernet speeds.

3.4 Powering On the Unit

The Switch uses an AC 100~240V or DC power supply of 9~32V DC. The power and redundant power connection is provided via a terminal block located at the top of the Switch. The Switch's power supply automatically self-adjusts to the local power source and may be powered on without having any or all LAN segment cables connected.

Check the front-panel LEDs as the device is powered on to verify that the Power LED is lit. If not, check that the power cable is correctly and securely plugged in.

3.5 Connecting Fiber Cable

When connecting a fiber cable to the 100BASE-FX port on the Switch, be sure the correct type of connector (ST or SC) is used. Follow the steps below to properly connect fiber cabling:

1. Remove and keep the fiber port's (ST/SC) rubber covers. When not connected to a fiber cable, the rubber cover should be replaced to protect the fiber optics.

2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

3. Connect one end of the cable to the ST/SC port on the Switch and the other end to the fiber port of the other device.

Note: When inserting the cable, be sure the tab on the plug clicks into position to ensure that it is properly seated.

Check the corresponding port LED on the Switch to be sure that the connection is valid. (Refer to the LED chart).

3.6 Connecting Copper Cable

The 10/100Base-T RJ-45 Ethernet ports fully support auto-sensing and auto-negotiation.

1. Insert one end of a Category 3/4/5/5e (see recommendation above) type twisted-pair cable into an available RJ-45 port on the Switch and the other end into the port of the network node.

2. Check the corresponding port LED on the Switch to ensure that the connection is valid. (Refer to LED chart)

3.7 Connecting the Console Port Cable

The console port (DB-9) provides the out-of-band management facility.

1 Use null modem cable to connect the console port on the Switch and the other end into the COM port of the computer.

2 Insert the RJ-45 side of the (8-pin RJ-45 to DB-9) cable into the RJ-45 console port on the Switch and the other end into the COM port of the computer.

3 Configure the Hyper Terminal settings as mentioned in chapter 7.

For console port (8 pin RJ-45) pin assignment, please see **Appendix A.**

3.8 Connecting to computers or a LAN

You can use Ethernet cables to connect computers directly to the Switch ports. You can also connect hubs/switches to the switch ports by Ethernet cables. You can use either crossover or straight-through Ethernet cables to connect computers, hubs, or switches.

3.9 Attaching the power adapter

Connect the AC power cord to the POWER receptacle on the back of the Switch and plug the other end of the power cord into a wall outlet or a power strip.

Check the front LED indicators with the description in the next chapter. If the LEDs light up as described, the Switch's hardware is working properly.

4 LED Indicators

This Switch is equipped with Unit LEDs to enable you to determine the status of the Switch, as well as Port LEDs to display what is happening in all your connections. They are as follows:

Unit LEDs		
LED	**Condition**	**Status**
PWR	On (Green)	Switch uses primary power
	Off	Primary power off or failure
POST	Flashing (Green)	Indicating POST function upon start-up
	On	POST function successfully performed
100 (1st to 8th Copper Ports and 9th Fiber Port)	On (Green)	Port operating at 100Mbps
	Off	Port operating at below 100Mbps
LNK/ACT (1st to 8th Copper Ports and 9th Fiber Port)	On (Green)	Illuminated when the port is connected with compliant device
	Flashing (Green)	Data traffic passing through port
	Off	No valid link established on port

NOTE 1: The fiber module does not support "half-duplex" mode.

5 Enhanced Features

5.1 Xpress Ring

Xpress Ring is a VOLKTEK proprietary ring protocol that enables networks to recover from link failure within 50ms. To enable Xpress Ring, it needs some network configuration: the user must assign two ring ports for each Switch in the ring. The user must also assign the Arbiter Switch which will decide if it is necessary to activate the backup path. For Xpress Ring, any switch can be the arbiter – just remember that the Arbiter Switch must be part of the ring.

Apart from rerouting the transmission within 50ms, the Arbiter Switch will also issue an alarm when a link failure occurs. The user will then be informed of the failure and will be able to fix the problem and reconfigure if required.
Xpress Ring is the fastest ring recovery technology and is ideal for networks where the ring topology is not changed very often.

For configuration of Xpress Rings, please refer to the appropriate chapter in this manual.

6 Configuration

6.1 Overview of configuration options

For advanced management capabilities, the onboard management agent provides CLI interface configuration programs. These programs can be accessed by a direct or modem connection to the console port on the front panel (out-of-band), or by a Telnet connection over the network (in-band).

The management agent is based on SNMP (Simple Network Management Protocol). This SNMP agent permits the switch to be managed from any PC in the network by using in-band management software.

The management agent also includes an embedded HTTP Web agent. This Web agent can be accessed using a standard Web browser from any computer attached to the network.

The switch gives you the flexibility to access and manage it by using any or all of the methods described. The administration console and web browser interfaces are embedded in the Switch software and can be used immediately after setup.

6.2 External SNMP-based network management application

Advantages

- Communicates with Switch functions at the MIB level
- Based on open standards

The two methods for configuring the Switch management agent are explained in the following chapters.

The first method – Command Line Interface (CLI) via the Console Port to initially set IP parameters.

The second is the use of an Internet Browser Interface to configure the Switch.

7 Management via Console Port

Out-of-Band Connection
Prior to accessing the switch's onboard agent via a network connection, you must first configure it with a valid IP address, subnet mask, and default gateway using an out-of-band connection or the BOOTP protocol.

After configuring the switch's IP parameters, you can access the onboard configuration program from anywhere within the attached network or via the internet. The onboard configuration program can be accessed using Telnet from any computer attached to the network. It can also be managed from any computer using a Web browser (Internet Explorer 4.0 or above, or Netscape Navigator 4.0 or above).

Access the Switch via a terminal emulator (such as Hyper Terminal) attached to the console port. The console port is set at the factory with the following default COM port properties. Configure your own terminal to match the following:

Baud rate:	38,400
Data size:	8bits
Parity:	None
Stop bits:	1
Flow Control:	None

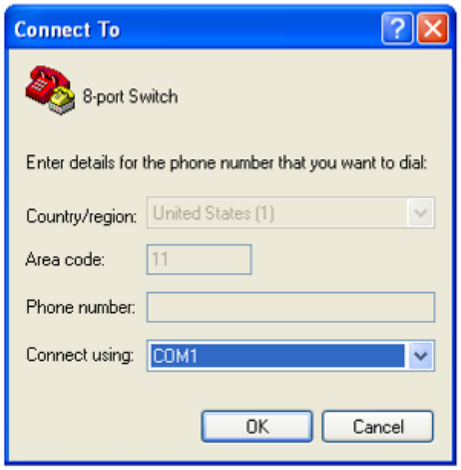
Note: Ensure that the terminal or PC you are using to make this connection is configured to match the above settings. Otherwise the connection will not work.

A console port cable is provided with the Switch to connect the PC's COM port with the switch's serial console (RJ-45) port. Please see Appendix A for cable pin assignment details.

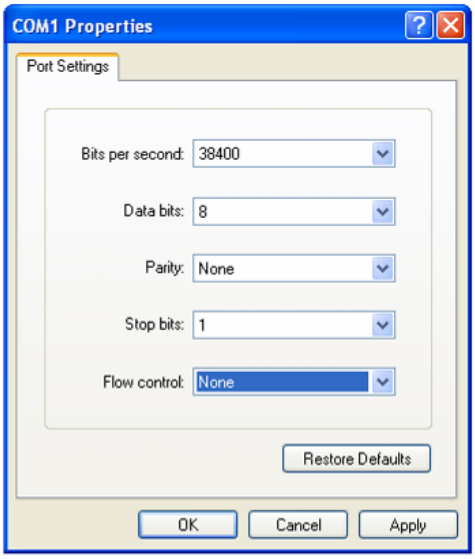
7.1 Connecting a HyperTerminal

Prior to following the instructions listed below for HyperTerminal, verify that a console cable (RJ45 to DB9) connection between the Switch and work station exists. Then follow the steps below:

1. Launch the terminal emulation program on the remote workstation and power on the Switch. Be sure to select the correct COM port.



2. Enter the correct parameters according to the defaults given above.



1. The following screen will appear on your monitor.

```
VOLKTEK Corporation
System version: 1.00.00 (built at Dec 3 2007 10:10:58)

Username:
```

2. The default log-in name is "**admin**" with no preset password.
   The system provides CLI user interface via console or telnet. After you log into the system, the default privilege level is read only, displayed with the "**>**" prompt.

```
Username: admin
Password:
NSH-5509>
```

3. Type "**enable**" and press "**Enter**" to turn on read/write privileged command mode.

```
NSH-5509> enable

NSH-5509#
```

After log-in, type the following command to change the device's IP address, Network Mask and Gateway Address:

```
NSH-5509# config terminal
NSH-5509(config)# ip xxx.xxx.xxx.xxx
NSH-5509(config)# netmask xxx.xxx.xxx.xxx
NSH-5509(config)# gateway xxx.xxx.xxx.xxx
```

The **xxx**'s represent values between **0** and **255** and the user should enter their own IP address in this form. The configuration program will not accept anything outside this format. Remember to separate each part of the address with a period (dot). For example:

```
NSH-5509# config terminal
NSH-5509(config)# ip 192.168.99.222
NSH-5509(config)# netmask 255.255.255.0
NSH-5509(config)# gateway 192.168.99.1
```

4. These system parameters are invalid until you save configuration with "**write memory**" command. After you enter "**write memory**" command, the system will auto restart immediately.

```
NSH-5509(config)# exit
NSH-5509# write memory
It takes a few moments to write memory...

NSH-5509# write memory $$$ Restart system....!!!
```

After the system restarts completely, you can type in "show ip" command to verify system settings.

```
NSH-5509# show ip
[eth0] Network Configuration:
MAC Address : 00:0B:04:09:03:07
DHCP Client: Disabled
IP Address: 192.168.99.222
Netmask   : 255.255.255.0
Gateway   : 192.168.99.1
```

When the address has been changed, please make a note of the new address, and keep it in a safe place. With HyperTerminal, the command lines are the same as that for telnet.

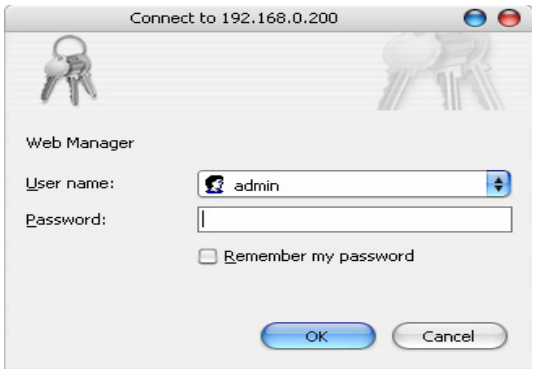
Note: ***IP addresses are unique. If an address isn't available, please contact the appropriate authorities to apply for one.***

8 Management via Internet Browser Interface

8.1 Overview

This section gives a step-by-step guide to configuring the Switch's management functions. A series of screen shots and instructions illustrate the main menu structure and how it works.
Firstly, open a web browser and key in the Switch's IP address – then press Enter. A Web Manager page like this will pop up on your screen:

Log in

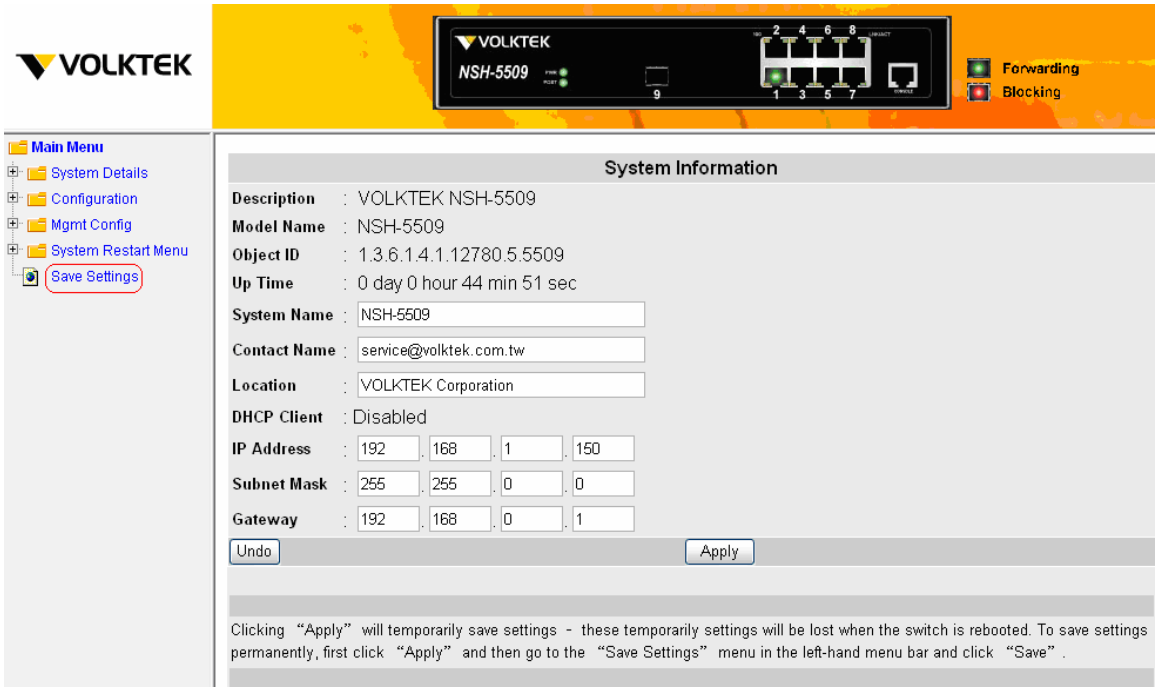


The default username is: **admin**
There is no preset password for this device, so click on "**OK**" to proceed.

8.2 System Details

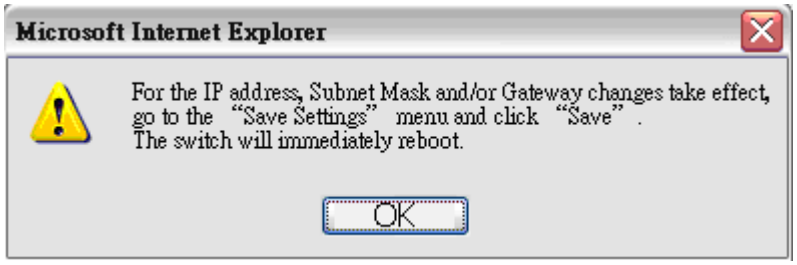
When your Web browser connects with the Switch's Web agent, the home page is displayed as shown below. The home page displays the Main Menu on the left side of the screen and System Information as the main page. The Main Menu links are used to navigate to other menus and display configuration parameters and statistics.

8.2.1 Homepage (System Details / System Info)

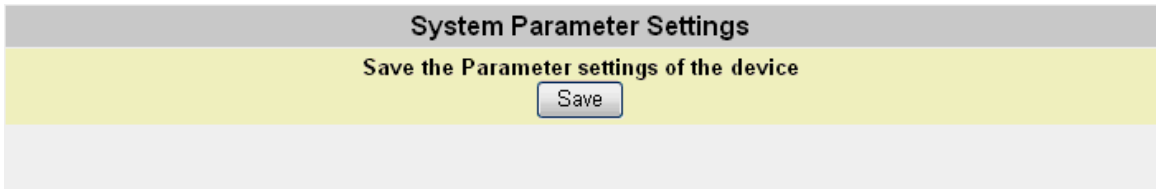

VOLKTEK
NSH-5509
Forwarding
Blocking
Main Menu
System Details
Configuration
Mgmt Config
System Restart Menu
Save Settings
System Information
Description : VOLKTEK NSH-5509
Model Name : NSH-5509
Object ID : 1.3.6.1.4.1.12780.5.5509
Up Time : 0 day 0 hour 44 min 51 sec
System Name : NSH-5509
Contact Name : service@volktek.com.tw
Location : VOLKTEK Corporation
DHCP Client : Disabled
IP Address : 192 . 168 . 1 . 150
Subnet Mask : 255 . 255 . 0 . 0
Gateway : 192 . 168 . 0 . 1
Undo
Apply
Clicking "Apply" will temporarily save settings - these temporarily settings will be lost when the switch is rebooted. To save settings permanently, first click "Apply" and then go to the "Save Settings" menu in the left-hand menu bar and click "Save" .

Click on each parameter field to modify the specific settings, click “Undo” to restore previously saved configurations or click “Apply” to implement newly entered information.

If you change the settings of “IP Address”, “Subnet Mask”, and “Gateway” on “System information” page, and click “Apply” to implement settings. The system will notify you to save these settings with a pop-on dialog box.


Microsoft Internet Explorer
For the IP address, Subnet Mask and/or Gateway changes take effect, go to the "Save Settings" menu and click "Save" .
The switch will immediately reboot.
OK

To save this configuration to flash memory, click “Saving Settings” on the bottom of “Main Menu”, it will link to saving page, then click the “Save" button.



****Note:**

If you change the settings of ‘IP Address’, ‘Subnet Mask’, and ‘Gateway’ on the ‘System information’ page, or DHCP setting on ‘DHCP configuration’ page, you must save these parameters in order for them to come into effect after you click

the 'Apply' button. The system will auto restart after you click 'Save' button on the Save Settings page.
Other parameters on any page will come into effect immediately after you click 'Apply' button, but will not be saved to flash memory until you go to the Save Settings page and click the 'Save' button. In this case, the system will not restart.

The system information is described below:

Parameter	Description
Description	Provides description of the Switch
Object ID	ID or Serial number
Up Time	Provides information on up time, or the time that the system has been operating
System Name	Modifies the name of the Switch
Contact	Enter a contact name
Location	Enter the location of Switch
DHCP Client	Disabled or client's name
IP Address	Default: 192.168.0.254
Subnet Mask	Default: 255.255.255.0
Gateway	Default: 192.168.0.1

Note:
The above are factory defaults used as an example only. A new address is important. Choose numbers between 0 and 254 in each sub-address field. Make a note of them and keep the details in a safe place. In writing this manual we used IP address 192.168.0.201 and Subnet Mask (255.255.0.0).

8.2.2 Board Info

This page displays version information about system's hardware and firmware.

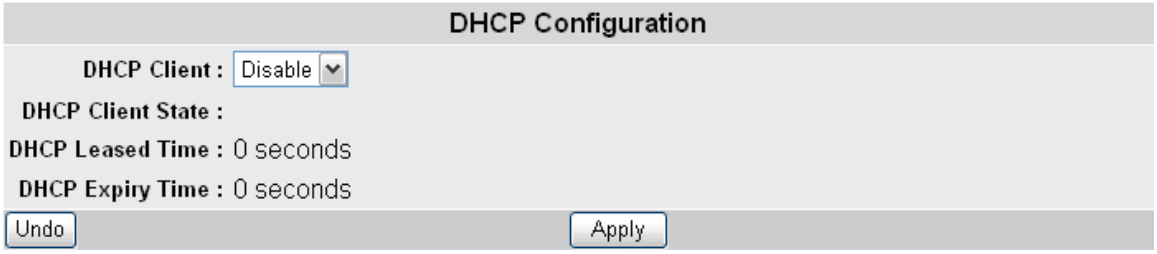
Board Information

Hardware Version : 1700-055090
Firmware Version : 1.00.00 (built at Dec 3 2007 10:10:58)
Port Number : 9

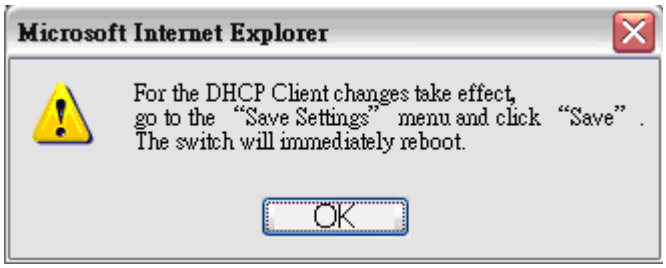
Parameter	Description
Hardware Version	Provides information on the hardware version
Firmware Version	Provides information on the firmware version
Port Number	Provides information on the number of ports available

8.2.3 DHCP Configuration

Disable or enable the DHCP Client role of the Switch. Once the DHCP Client is enabled, the IP address of the Switch is obtained from DHCP Server and you need to check the new IP address via the Serial Console.



If you change the setting of “DHCP Client”, and click “Apply”, the system will notify you to save the setting with a pop-up dialog box.

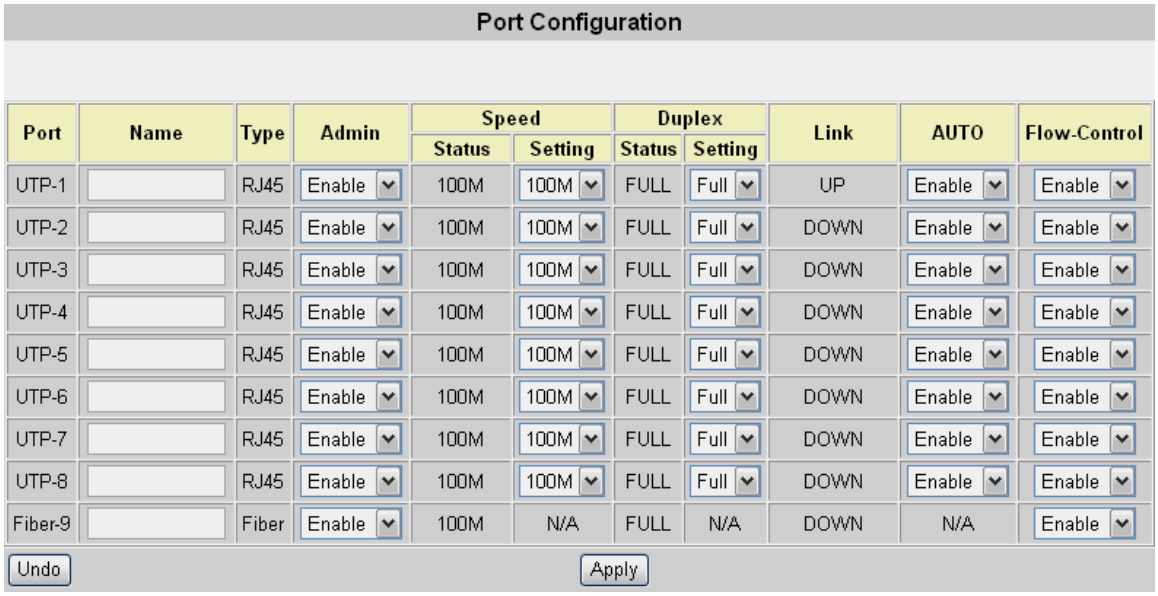

Microsoft Internet Explorer
For the DHCP Client changes take effect, go to the “Save Settings” menu and click “Save”. The switch will immediately reboot.
OK

8.3 Configuration

Port Configuration

This section allows you to view and change the parameter settings for the individual ports on the Switch. See screen shot and table below for adjustable parameters.

8.3.1 Port Configuration


Port Configuration
Port
Name
Type
Admin
Speed
Status
Setting
Duplex
Status
Setting
Link
AUTO
Flow-Control
UTP-1 RJ45 Enable 100M 100M FULL Full UP Enable Enable
UTP-2 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-3 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-4 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-5 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-6 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-7 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
UTP-8 RJ45 Enable 100M 100M FULL Full DOWN Enable Enable
Fiber-9 Fiber Enable 100M N/A FULL N/A DOWN N/A Enable
Undo
Apply

Click on each parameter field to modify the desired setting, then click “Undo” to restore previously saved configurations or click “Apply” to implement newly entered information. See description below:

Parameter	Description
Port	Port type and number
Name	Assign a name to each port to keep record of your connections
Type	Type of connector for each port (auto-detects fiber or RJ-45)
Admin	Enable or disable admin configurations
Speed: Status	Provides information on speed at which ports are currently operating
Speed: Setting	Set speed for RJ-45 ports. (The speed for fiber ports is fixed)
Duplex: Status	Provides information on Duplex Status
Duplex: Setting	Select half / full duplex modes
Link	Provides information on link status
Auto	Enable / Disable Auto-negotiation on copper ports
Flow Control	Enable / Disable flow control for each port

Note:
Disable the Auto (Auto-negotiation) function to configure Speed and Duplex. Click on “Undo” to restore previously saved configurations or click on “Apply” to implement newly entered information.

8.3.2 Port Status

Ports Status

Port	Name	Type	Admin	Speed	Duplex	Link	Auto	Flow Control
UTP-1		RJ45	Enabled	100M	FULL	UP	ON	Enabled
UTP-2		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-3		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-4		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-5		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-6		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-7		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
UTP-8		RJ45	Enabled	100M	FULL	DOWN	ON	Enabled
Fiber-9		Fiber	Enabled	100M	FULL	DOWN	OFF	Enabled

Port Configuration

This window offers at-a-glance status reporting for Switch operations. Click on the “Port Configuration” button to return to the “Port Configuration” window if you need to change any settings.

8.3.3 Ethernet Loop Detection

Loop Detection

Protection : Disable

MAC Address : 00.0b.04.ff.ff.ff **(Example: 00.01.02.03.04.05)**

Port	Enable / Disable
Port1	Disable
Port2	Disable
Port3	Disable
Port4	Disable
Port5	Disable
Port6	Disable
Port7	Disable
Port8	Disable
Port9	Disable

Undo Apply

Ethernet Loop Detection is used to detect Ethernet Loop conditions on active ports. Ethernet Loops cause broadcast storms and crash the whole network. Set “Protection” to enable or disable the Ethernet Loop Detection function of the Switch, and enable or disable it on the specific port. For MAC Address, users can use the default one as the destination MAC address for Ethernet Loop Detection. The default MAC Address is a multicast address. Some network switch does not forward packets with unrecognized multicast MAC address and discard those test packets sent out by the Switch for Ethernet Loop Detection. In this situation, the function cannot be correctly executed. Users can set another unicast MAC Address to cope with this condition. If the port is blocked by Switch for detected loop, it needs to be enabled manually after removing the Ethernet Loop.

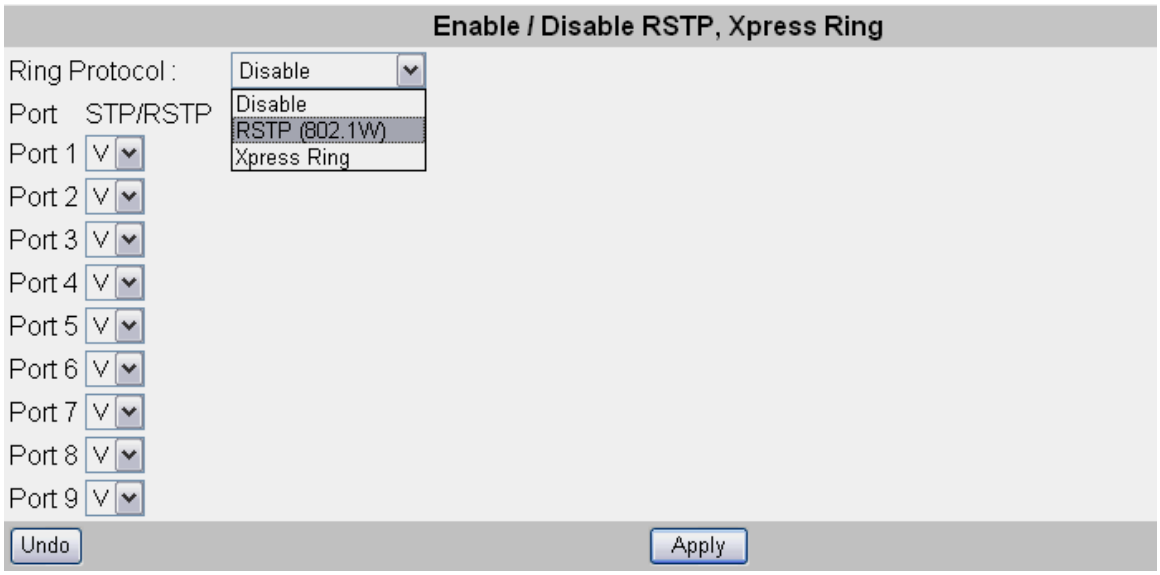
8.4 Bridge Menu

The Bridge menu is used for configuring the Spanning Tree Algorithm and Xpress Ring settings, as well as the traffic class priority threshold and the address aging time.

Xpress Ring offers a very fast link-failure recovery time of 50ms, user must select the role of the Switch (arbiter or forward) and which two ports will be part of the Xpress Ring network.

The Spanning Tree Algorithm is used for detecting and disabling network loops, and to provide backup links between switches, bridges or routers. This allows the switch to communicate and interact with other bridging devices (i.e. STA-compliant devices) in a network to ensure that only one route exists between any two stations, and it provides redundant or backup links that automatically take over when a primary link goes down.

8.4.1 Bridge Configuration (Enable / Disable RSTP, etc.)

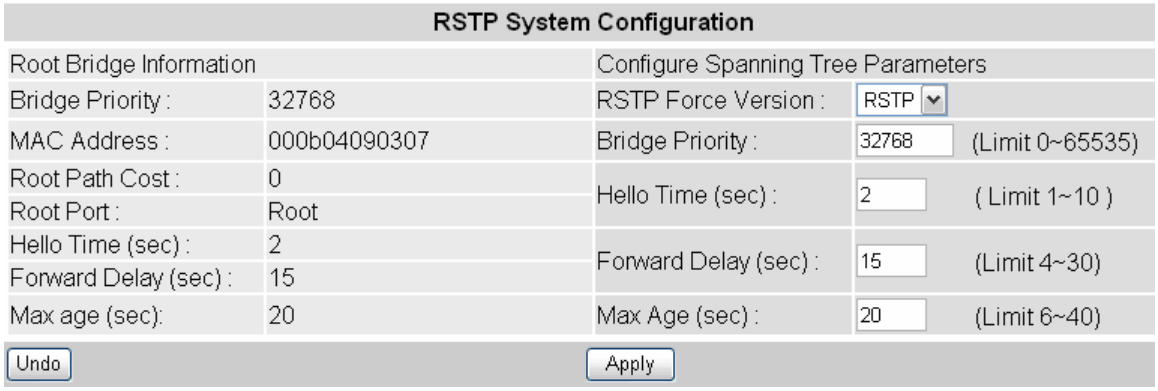


Select the appropriate mode (protocol) for your network implementation, then click “Apply” to implement newly entered information, or click “Undo” to restore previously saved configurations.

Parameter	Description
Disable	Don’t enable RSTP or Xpress Ring
RSTP (802.1W)	Enable Rapid Spanning Tree Protocol
Xpress Ring	Enable Xpress Ring function, redundant link with fastest recovery time: less than 50ms
Port 1~9	**Enable (V):** This port participates in the STP/RSTP algorithm execution of the Switch when RSTP (802.1W) is enabled. **Disable (_):** This port doesn't participate in the STP/RSTP algorithm execution of the Switch when RSTP (802.1W) is enabled.

8.4.2 RSTP System Configuration

This screen allows the user to enter the RSTP parameters for the Switch. Please note: users must select "**RSTP (802.1W)**" under Bridge Configuration to perform this configuration. Otherwise, this option will not be accessible.

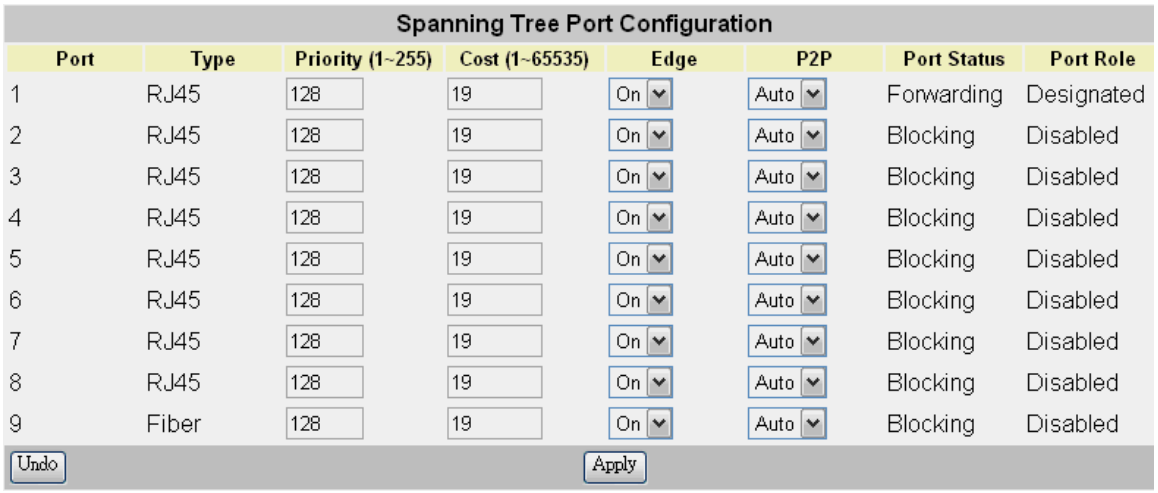

RSTP System Configuration
Root Bridge Information
Bridge Priority : 32768
MAC Address : 000b04090307
Root Path Cost : 0
Root Port : Root
Hello Time (sec) : 2
Forward Delay (sec) : 15
Max age (sec): 20
Configure Spanning Tree Parameters
RSTP Force Version : RSTP
Bridge Priority : 32768 (Limit 0~65535)
Hello Time (sec) : 2 (Limit 1~10)
Forward Delay (sec) : 15 (Limit 4~30)
Max Age (sec) : 20 (Limit 6~40)
Undo
Apply

Enter the appropriate values, then click on "Apply" to implement newly entered information or click on "Undo" to restore previously saved configurations.

Parameter	Description
RSTP Force Version	Force the spanning tree algorithm to run on "RTP" or "RSTP" protocol version
Bridge Priority	Set the bridge priority. The limit is given between 0 (the highest priority) and 65535 (the lowest priority). Bridge priority is used in selecting the root device, root port, and designated port. The device with the highest priority becomes the STA root device. However, if all devices have the same priority, the device with the lowest MAC address will then become the root device.
Hello Time	Set the interval between hello bridge protocol data units (BPDUs) sent by root switch configuration messages. The limit given is from 1 – 10 seconds.
Max. age	Set the interval between messages that the spanning tree receives from the root switch. If a switch does not receive a bridge protocol data unit (BPDU) message from the root switch within this interval, it will reconfigure the spanning-tree topology. The limit given is from 6 – 40 seconds.
Forward Delay	Set Forward Delay. The limit given is from 4~30 seconds. The forwarding time specifies how long each of the listening and learning states last before the port begins forwarding.

8.4.3 RSTP Per-Port Configuration

STP/RSTP allows the Switch to assign a priority status to each of its ports, with respect to other networking nodes in the network. In other words, STP/RSTP determines the best link for data to flow, given the priority level of each node on the network. Ensure that this function is activated to avoid collisions and when setting up backup links.



Spanning Tree Port Configuration

Port	Type	Priority (1~255)	Cost (1~65535)	Edge	P2P	Port Status	Port Role
1	RJ45	128	19	On	Auto	Forwarding	Designated
2	RJ45	128	19	On	Auto	Blocking	Disabled
3	RJ45	128	19	On	Auto	Blocking	Disabled
4	RJ45	128	19	On	Auto	Blocking	Disabled
5	RJ45	128	19	On	Auto	Blocking	Disabled
6	RJ45	128	19	On	Auto	Blocking	Disabled
7	RJ45	128	19	On	Auto	Blocking	Disabled
8	RJ45	128	19	On	Auto	Blocking	Disabled
9	Fiber	128	19	On	Auto	Blocking	Disabled

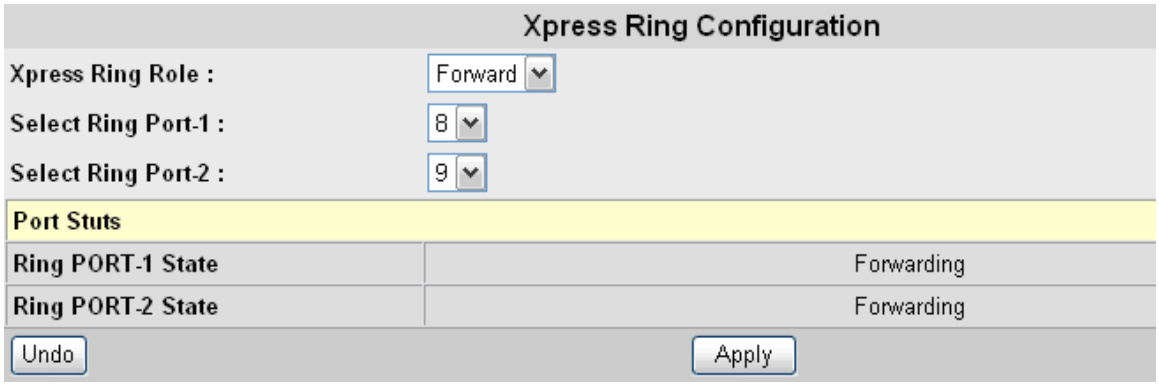
Undo Apply

Click on each parameter field to modify the desired setting, then click on “Undo” to restore previously saved configurations or click on “Apply” to retain newly entered information. See description below:

Parameter	Description
Port Type Priority	Set the priority of each port. The limit given is from 1 – 255. The lowest number means highest priority. The default priority is set to 128 – the midpoint of this limit
Cost	Set the cost assigned to each port. This will determine the route of information flow. The higher the cost the less suitable the port is to be a node for the STP.
Edge	On: the port is connected to an end node, e.g., a network card installed in a PC Off: the port is connected to a bridged node
P2P	On: the link type of the port is Point-to-Point, connecting to one Bridge Off: the link type of the port is Shared Medium, connecting to multiple Bridges Auto: the link type is automatically determined

8.4.4 Xpress Ring Configuration

If Xpress Ring was enabled, you must set the Switch’s role in the Xpress Ring network and the ports that will be part of the Xpress Ring. Every switch participated the Xpress Ring environment should be exactly defined.



Xpress Ring Role

Arbiter – the Switch which receives status reports submitted from other Switches of the ring and determines ring recovery behavior.

Forward – the Switch which is not the Arbiter of the ring and will forward the received status reports on the other side of ring ports.

Select Ring Port-1: the first port composes the Xpress Ring of this switch.
Select Ring Port-2: the second port composes the Xpress Ring of this switch.

Port status: display the port status. “Forwarding” means packets transmitting and receiving were at normal status on this port, “Blocking” means this port was disabled or link was down.

8.5 VLAN Menu

A VLAN is a network of computers behaving as though they are connected to the same segment, even though their physical location may be on a different segment of a LAN altogether. VLANs are configured through software rather than hardware, which make them extremely flexible.

Some of the advantages of VLANs are:

- When a computer is physically moved to another location, it can stay on the same VLAN without any hardware reconfiguration because VLANs are not limited by hardware constraints.

- VLANs can be configured to define a network into various logical configurations. For example, VLANs can define a network by application. In this scenario, a company might create one VLAN for multimedia users and another for e-mail users.

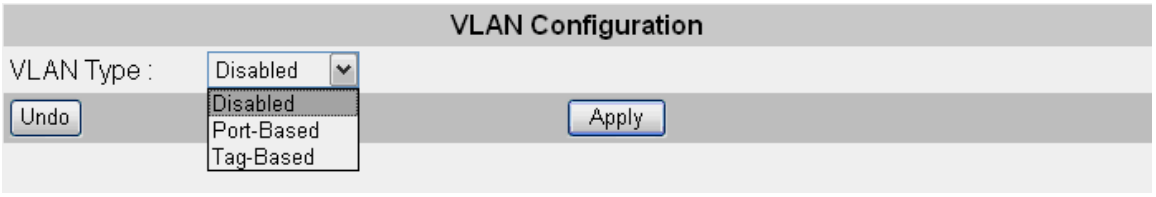
- VLANs can also define a network by department. For example, a company might have one VLAN for its Engineering Department, another for its Marketing Department, and another for its Sales Department.

- VLANs can also be set up according to the organization’s internal structure. For example, the company president might have his/her own VLAN, the executive staff

might have a different VLAN, and the remaining employees might have yet a different VLAN.

As these examples show, VLANs offer incomparable flexibility. The following section describes how VLANs can be deployed using the Switch.

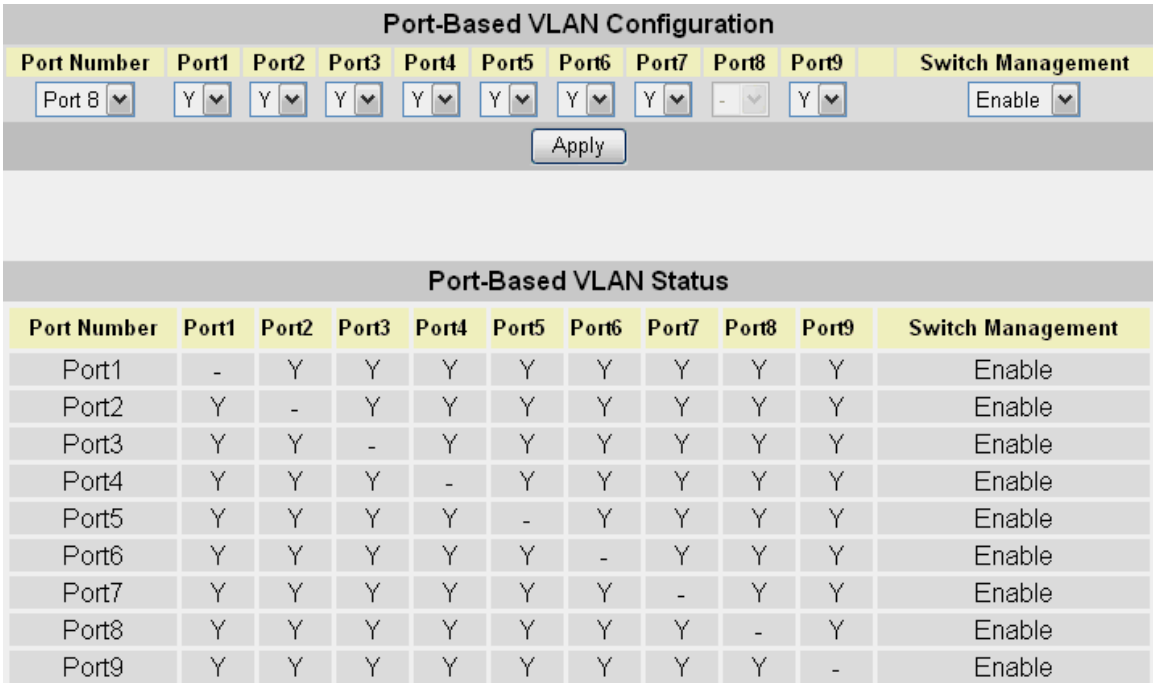
8.5.1 VLAN Type (VLAN Configuration)



The “VLAN Type” menu let users select the VLAN type of the Switch.

Parameter	Description
Disabled	The VLAN function is disabled.
Port-Based	The VLAN function is enabled for Port-based VLANs.
Tag-Based	The VLAN function is enabled for IEEE802.1Q VLANs

8.5.2 VLAN Configuration (Port-based)


Port-Based VLAN Configuration
Port Number Port1 Port2 Port3 Port4 Port5 Port6 Port7 Port8 Port9 Switch Management
Port 8 Y Y Y Y Y Y Y - Y Enable
Apply
Port-Based VLAN Status
Port Number Port1 Port2 Port3 Port4 Port5 Port6 Port7 Port8 Port9 Switch Management
Port1 - Y Y Y Y Y Y Y Y Enable
Port2 Y - Y Y Y Y Y Y Y Enable
Port3 Y Y - Y Y Y Y Y Y Enable
Port4 Y Y Y - Y Y Y Y Y Enable
Port5 Y Y Y Y - Y Y Y Y Enable
Port6 Y Y Y Y Y - Y Y Y Enable
Port7 Y Y Y Y Y Y - Y Y Enable
Port8 Y Y Y Y Y Y Y - Y Enable
Port9 Y Y Y Y Y Y Y Y - Enable

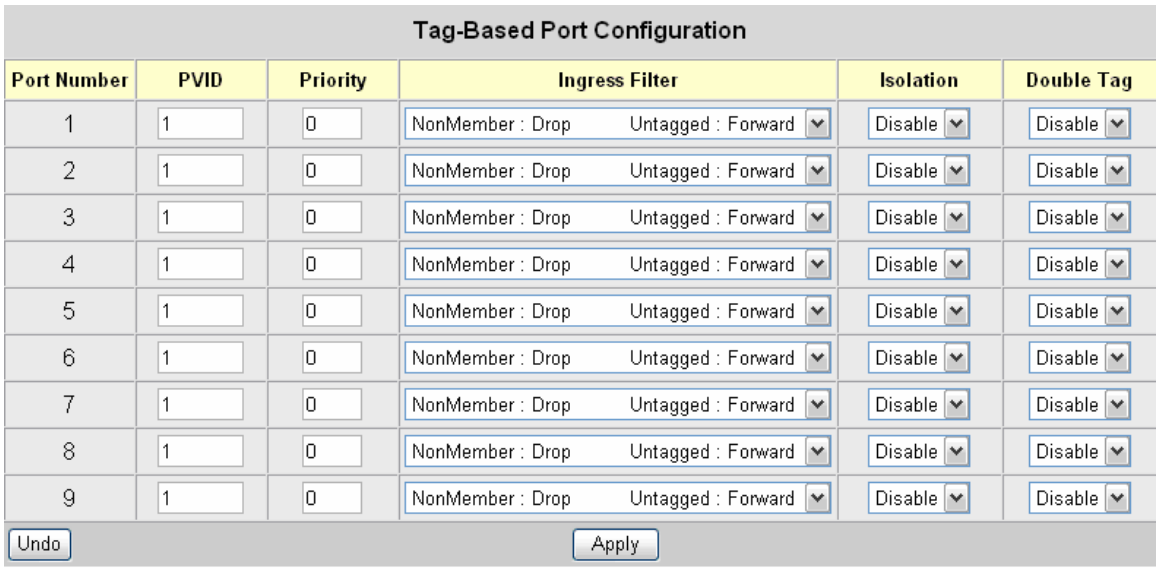
The “Port-based” menu is for configuration of Port-Based VLAN. It is enabled only when the VLAN Type is set as “Port-Based”.

For each port the user must click on the checkboxes of the ports to decide which port is allowed to switch frames from the configured port. Click on “Apply” to implement newly entered information or click on “Undo” to restore previously saved configurations.

Enable / Disable Switch Management:

Enable: The user can manage the Switch as Web/Telnet Client or SNMP Manager via this port.
Disable: The Switch is not manageable from Web/Telnet Client or SNMP Manager via this port.

8.5.3 Tag-based VLAN Port Configuration (Port Info)

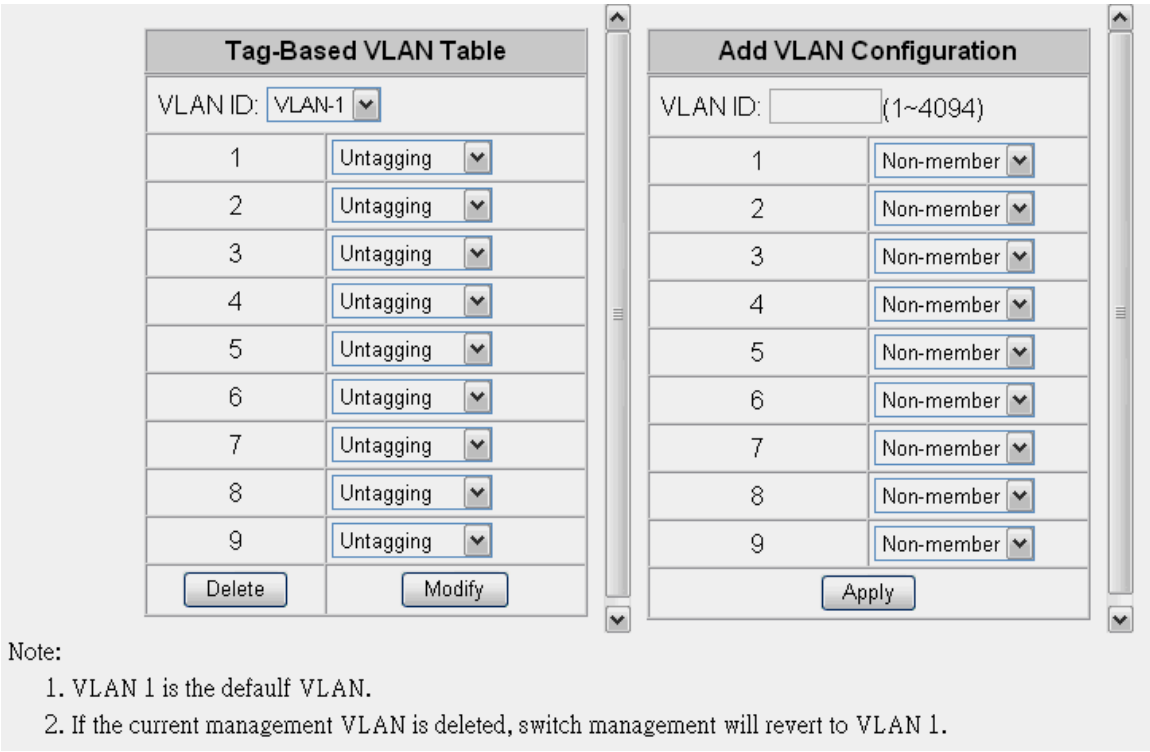

Tag-Based Port Configuration
Port Number
PVID
Priority
Ingress Filter
Isolation
Double Tag
1 1 0 NonMember : Drop Untagged : Forward Disable Disable
2 1 0 NonMember : Drop Untagged : Forward Disable Disable
3 1 0 NonMember : Drop Untagged : Forward Disable Disable
4 1 0 NonMember : Drop Untagged : Forward Disable Disable
5 1 0 NonMember : Drop Untagged : Forward Disable Disable
6 1 0 NonMember : Drop Untagged : Forward Disable Disable
7 1 0 NonMember : Drop Untagged : Forward Disable Disable
8 1 0 NonMember : Drop Untagged : Forward Disable Disable
9 1 0 NonMember : Drop Untagged : Forward Disable Disable
Undo
Apply

The menu “Tag-Based” is for configuration of Tag-Based VLAN. It is enabled only when the VLAN Type is set as “Tag-Based”. The sub-menu lets users configure the way in which each port treats the incoming frames that are marked for Tag-based VLANs.

Parameter	Description
VID	Set the VLAN ID. The limit is 1 to 4095. The VLAN ID is assigned to all untagged frames received on this port.
Priority	Set VLAN Priority. The limit given is between 0 – 7. 0 is the lowest priority and 7 is the highest priority.
Ingress Filter 1 (Non-Member) and Filter 2 (Untagged)	● Non-Member (1): Forward and Untagged (2): Forward – Forward the VLAN-tagged frames that are not members of any VLAN in which the port is participating, and forward all untagged frames. ● Non-Member (1): Drop and Untagged (2): Forward – Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and forward all untagged frames. ● Non-Member (1): Drop and Untagged (2): Drop – Drop the VLAN-tagged frames which are not members of any VLAN of which the port is participating, and drop all untagged frames.

Isolation	Enable – The port is isolated. Isolated ports belonging to the same VLAN do not communicate with each other – this is generally set for security reasons. The isolated ports communicate only with the trunk ports, which should NOT be set as “isolated”. Disable – The port is not isolated and can communicate with all ports of the VLANs.
Double Tag	**Enable:** The egress frames are double-tagged. **Disable:** The egress frames are not double-tagged.

8.5.4 Tag-based Info (VLAN Table)



The sub-menu “Tag-based Info” let users add, modify, or delete entries in the Tag-based VLAN Table, the configurations of 802.1Q VLANs and the participating ports. Up to 64 VLANs can be configured on the Switch.

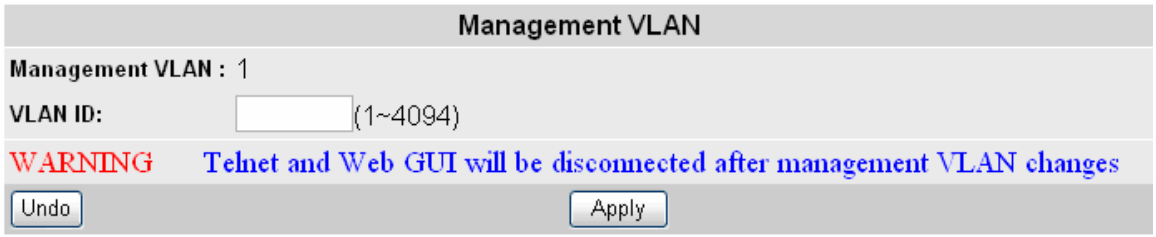
On the left is the Tag-based VLAN Table, where existing VLANs can be modified or deleted. In the combo box at the top is the VLAN ID (VID) numbers (1, 2, etc.) of the previously configured VLANs. Users can click on a VID number to display the port information of that VLAN. The following table describes the port parameters in regard to 802.1Q VLANs:

Parameter	Description
Member	The Port is a member of the specified VLAN and the frames of this VLAN can be switched through this port, but the tagging information in the frame header is not modified by the Switch.
Untagging	The port is an untagging port (as defined in 802.1Q) that is participating in the VLAN. In such an untagged port the Switch will strip off the 802.1Q tag from the incoming and outgoing frames if they are tagged in such a way. This is used for sending frames to non-802.1Q-compliant devices.
Tagging	The port is a tagging port (as defined in 802.1Q) and is participating in the VLAN. The Switch will put the VLAN information of the port – including VID and Priority – into the header of the untagged frames coming in or transmitted from the port. The tagged VLAN information in the frames can later be used by other 802.1Q-compliant devices for forwarding decisions.
Non-member	The port is not participating in the VLAN as identified by the selected VID (VLAN ID).

Click the “Modify” button to modify configurations of the selected VLAN according to the settings on the table.
Click the “Delete” button to delete the VLAN entries of the selected VID.

On the right is the “Add VLAN Configuration” work area where you can add VLAN configuration entries onto the Tagging VLAN Table. Enter a valid configurable 802.1Q VID ranging from 1 ~ 4094 into the field on the first row. Next, specify for each port the parameters described in the table above – this will decide if the specific port will participate in that specific VID and how it will participate. Click the “Apply” button to add the new VLAN to the Tag-based VLAN Table.

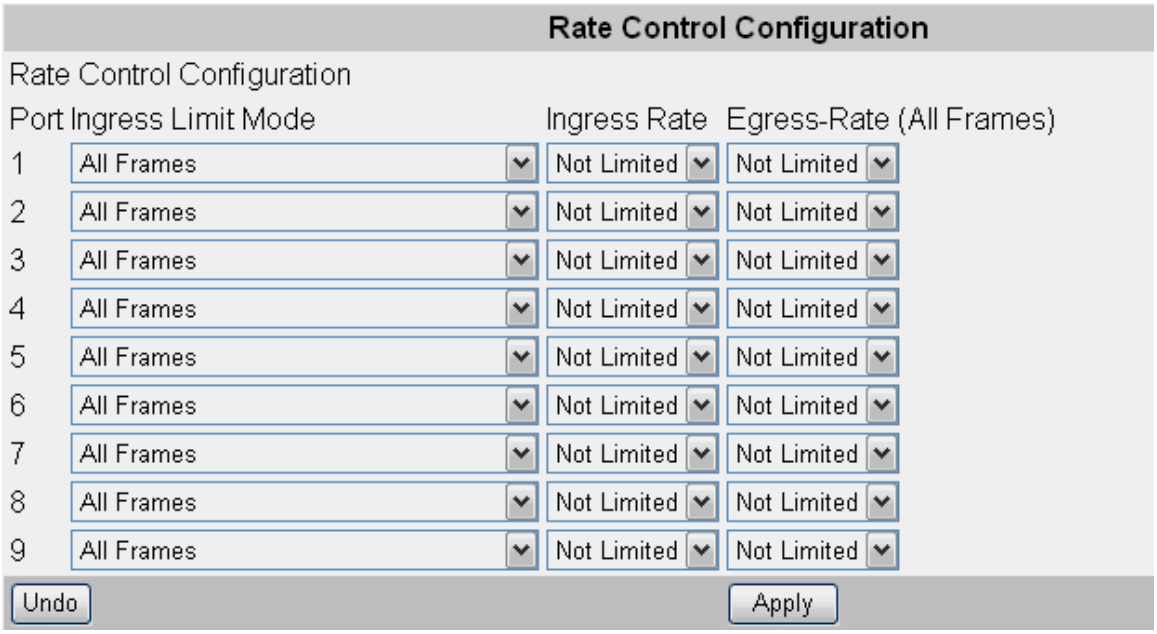
8.5.5 Management VLAN



The Management VLAN is the VLAN ID that in-band management stations belong to. The Port VLAN ID of the port that receives the management messages must be the same as the Management VLAN ID. The Web or Telnet session will be disconnected after the Management VLAN is changed.

8.6 Rate Control

Use this screen to set the Jumbo packet limit and the Rate Control for each port of the Switch.


Rate Control Configuration
Rate Control Configuration
Port Ingress Limit Mode
Ingress Rate
Egress-Rate (All Frames)
1 All Frames Not Limited Not Limited
2 All Frames Not Limited Not Limited
3 All Frames Not Limited Not Limited
4 All Frames Not Limited Not Limited
5 All Frames Not Limited Not Limited
6 All Frames Not Limited Not Limited
7 All Frames Not Limited Not Limited
8 All Frames Not Limited Not Limited
9 All Frames Not Limited Not Limited
Undo
Apply

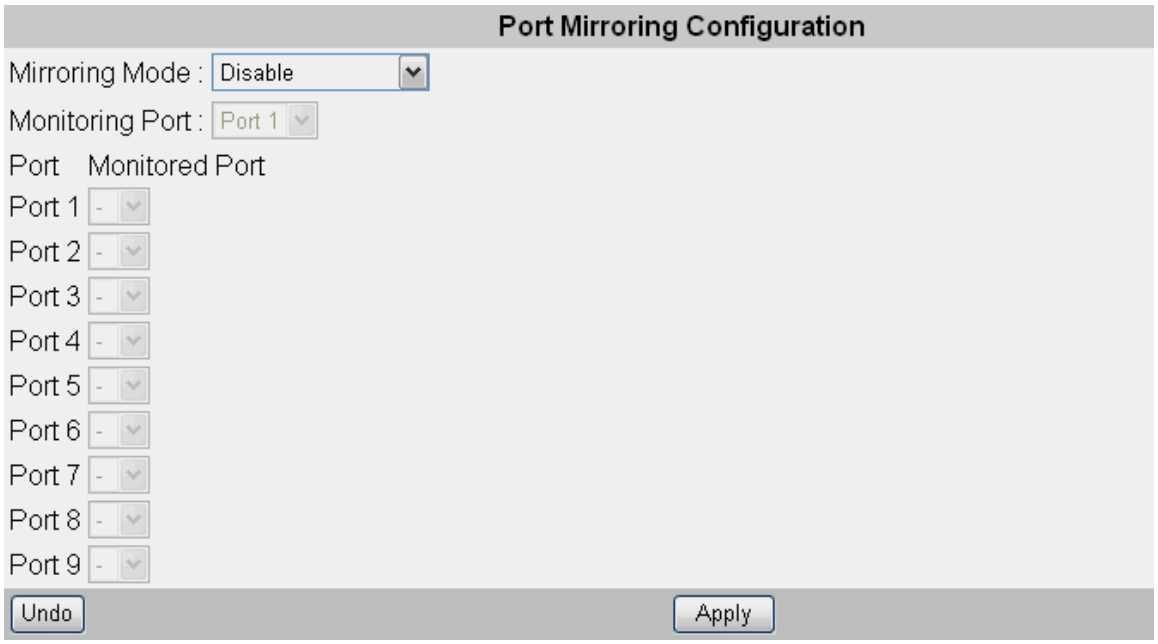
Click on each parameter field to modify the desired setting, then click “Apply” to implement newly entered information or click “Undo” to restore previously saved configurations.

Note: The maximum limited rate is 64Mbps.

Parameter	Description
Port Ingress Limit Mode	Select to block the specified traffic from the port. All Frames: – Restrict all kinds of packets (Default) exceeding the rate set in the Ingress/Egress Rate fields Multicast/Broadcast & Flooded unicast: – Restrict these packets when exceeding the set value Multicast/Broadcast only: – Restrict these packets when exceeding the assigned value Broadcast only: – Restrict broadcast only packets when exceeding the assigned limit
Ingress / Egress Rate	Set the threshold of traffic of limited packets for each port in the Switch

8.7 Port Mirroring

Set the port mirroring option to monitor data being transmitted through a specific port.

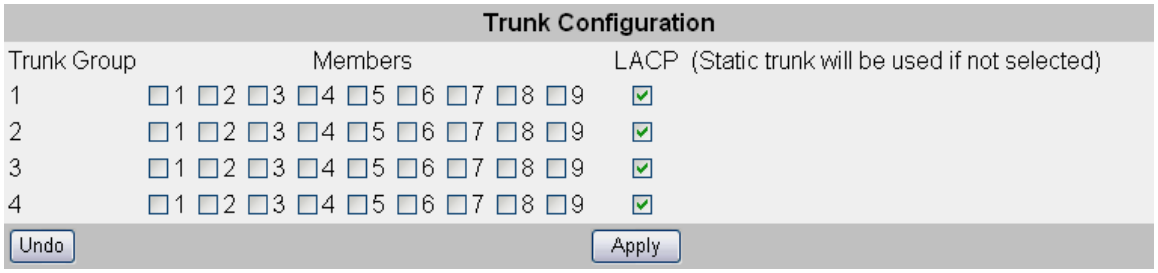


Click on each parameter field to modify the desired setting, then click “Apply” to implement newly entered information or click “Undo” to restore previously saved configurations.

Parameter	Description
Mirroring Mode	Select appropriate mode Disable: – Mirror mode is disabled Ingress & Egress: – Monitor both incoming and outgoing traffic Egress: – Monitor only outgoing traffic
Monitoring Port	Select the port which will do the monitoring
Monitored Port	Select the port that needs to be monitored

8.8 Trunk Configuration

8.8.1 Aggregator Setting


Trunk Configuration
Trunk Group
Members
LACP (Static trunk will be used if not selected)
1 1 2 3 4 5 6 7 8 9
2 1 2 3 4 5 6 7 8 9
3 1 2 3 4 5 6 7 8 9
4 1 2 3 4 5 6 7 8 9
Undo
Apply

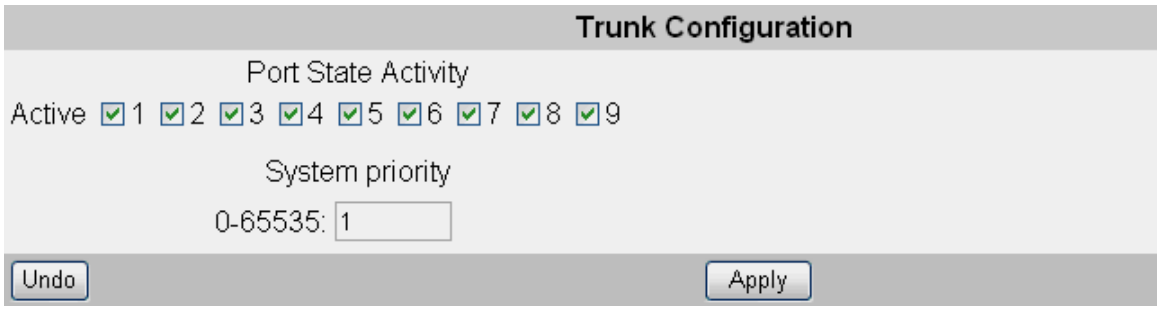
Port Trunking defines a network link aggregation and trunking method which specifies how to create a single high-speed logical link that combines several low-speed physical links. Use the Trunk Configuration page shown above to create trunk groups. The Switch supports a maximum of four trunk groups for 100Mbps ports. Each trunk group in groups 1~4 may be comprised of up to four ports, selected from any combination of 100Mbps ports.

Note: *Before you configure trunk group, check the setting of bridge function. If bridge function has been enabled, the system will display an error message when you click "Apply".*

Error: Cannot save while Bridge Function is enabled.

If the trunk group formed with another switch using protocol-based LACP, click to enable "LACP".

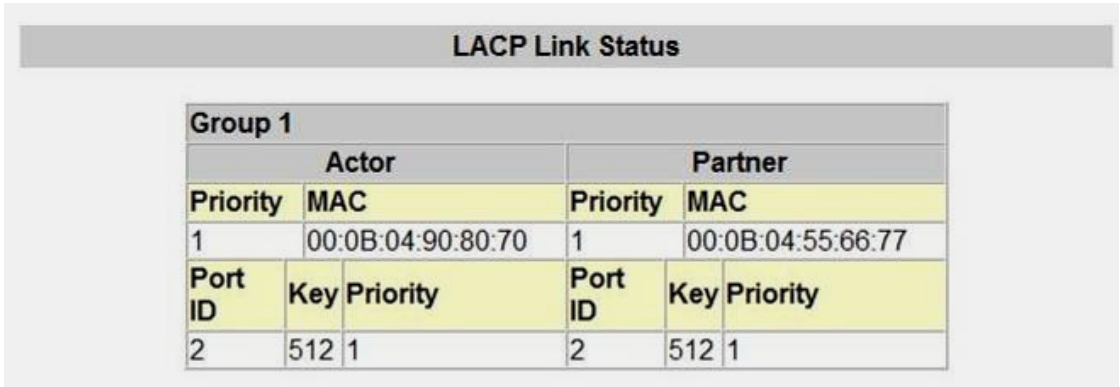
8.8.2 LACP Configuration



"Port State Activity" will determine whether the port will actively initiate the LACP negotiation. Enable "Active" if the port is active for LACP negotiation.

System priority is combined with the Switch's MAC address to form the Link Aggregation Group (LAG) ID. This ID is used to indicate a specific LAG during LACP negotiations with other systems.

8.8.3 LACP Link Status



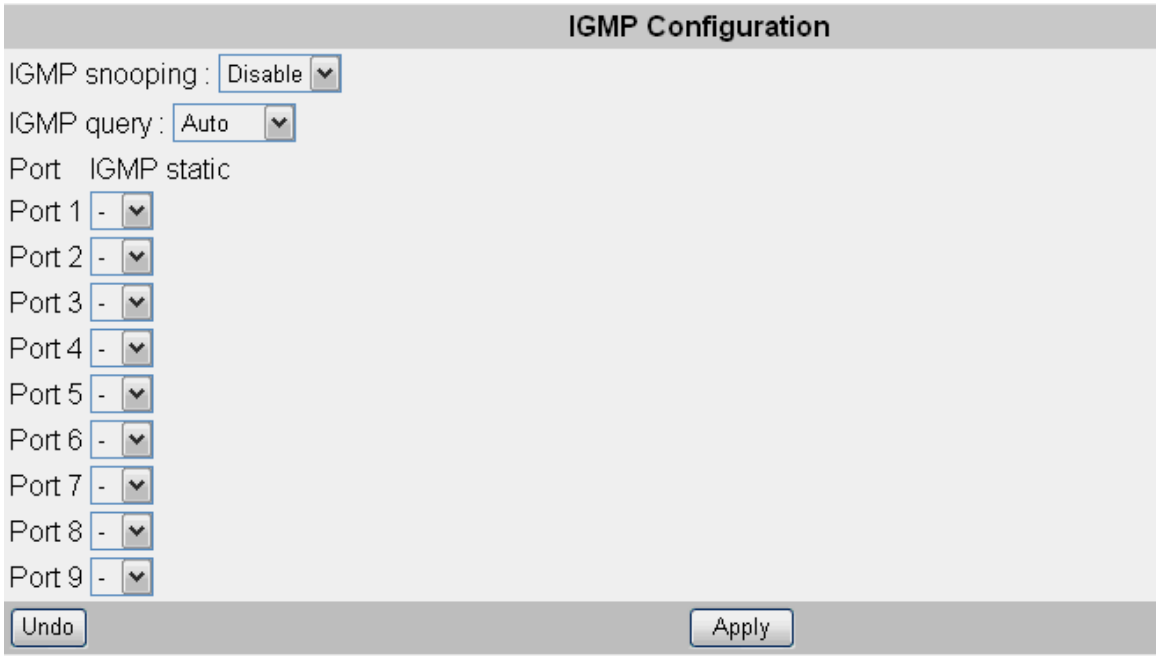
This window displays the LACP Link Status, including System Priority, MAC address, Port ID, Port Key, and Port Priority of Actor and Partner roles of the formed LACP groups.

8.9 IGMP Menu

Using the IGMP Menu

The IGMP menu is used for configuring IGMP snooping. IGMP means "Internet Group Management Protocol". It is a protocol through which hosts can register with their local router for multicast services. If there is more than one multicast router on a given sub-network, one of the routers is elected and assumes the responsibility of keeping track of group membership.

8.9.1 IGMP Configuration



This menu allows the user to Enable/Disable IGMP Snooping and IGMP Query.

Port 1~9 IGMP Static:
Enable (V): Multicast packets will be forwarded to IGMP Static ports without the learning process and timeout of multicast group membership. It is generally applied to those ports of uplinks or A / V equipment which will not be flexibly reconfigured.

Note: *In order to keep the switch traffic efficient, the last byte of the IP address should not be the same as in the IGMP group. E.g. if the Switch's IP address is 192.168.0.10 and the IGMP router / switch's IP address is 192.168.21.10, this will make the switch less efficient.*

8.9.2 IGMP Groups Status

This window will display the IGMP group status of the port members if IGMP traffic is present.

IGMP Groups Status

No.	Multicast Group	VLAN ID	1	2	3	4	5	6	7	8	9

8.10 MAC Menu

The MAC menu will enable the following configurations:

8.10.1 MAC Table Status

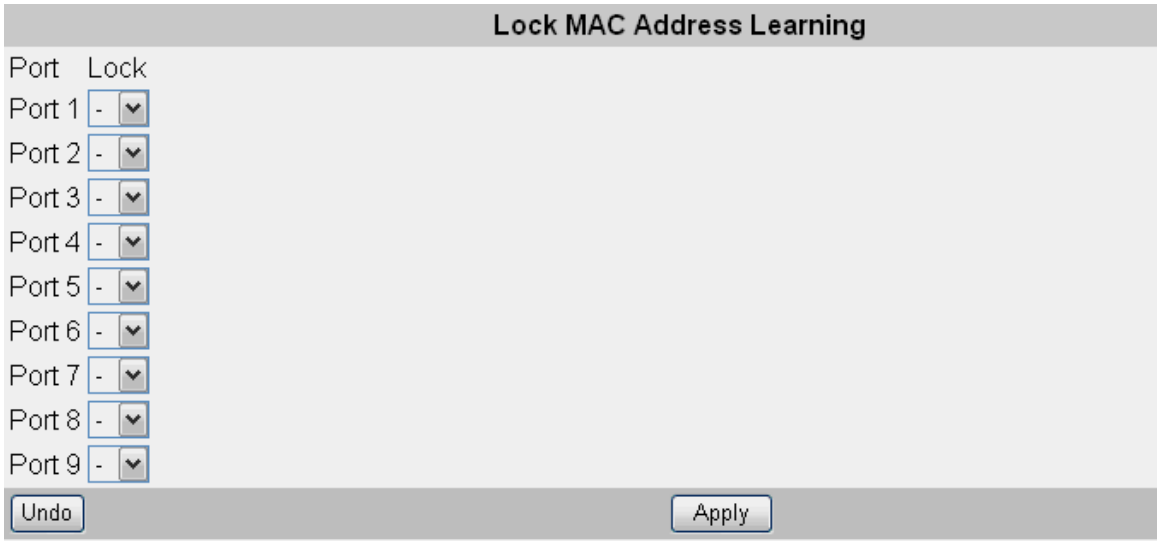
The user can view the MAC Table by selecting this function. On this page the mark "**P**" means the MAC is learned from a downlink port and the mark "**T**" means the MAC is learned from a trunk port.

MAC Table Status

No.	MAC-Address	Static	Priority	1	2	3	4	5	6	7	8	9
0001	00-00-21-FF-FF-FF	No	00	P	-	-	-	-	-	-	-	-
0002	00-01-29-20-2E-69	No	00	P	-	-	-	-	-	-	-	-
0003	00-01-29-4C-0B-CA	No	00	P	-	-	-	-	-	-	-	-
0004	00-03-9D-73-DB-B0	No	00	P	-	-	-	-	-	-	-	-
0005	00-04-7E-01-03-DC	No	00	P	-	-	-	-	-	-	-	-
0006	00-04-ED-44-1B-12	No	00	P	-	-	-	-	-	-	-	-
0007	00-08-02-62-0B-09	No	00	P	-	-	-	-	-	-	-	-
0008	00-08-9B-0C-06-11	No	00	P	-	-	-	-	-	-	-	-
0009	00-08-9B-0C-06-28	No	00	P	-	-	-	-	-	-	-	-
0010	00-08-9B-1B-35-0B	No	00	P	-	-	-	-	-	-	-	-

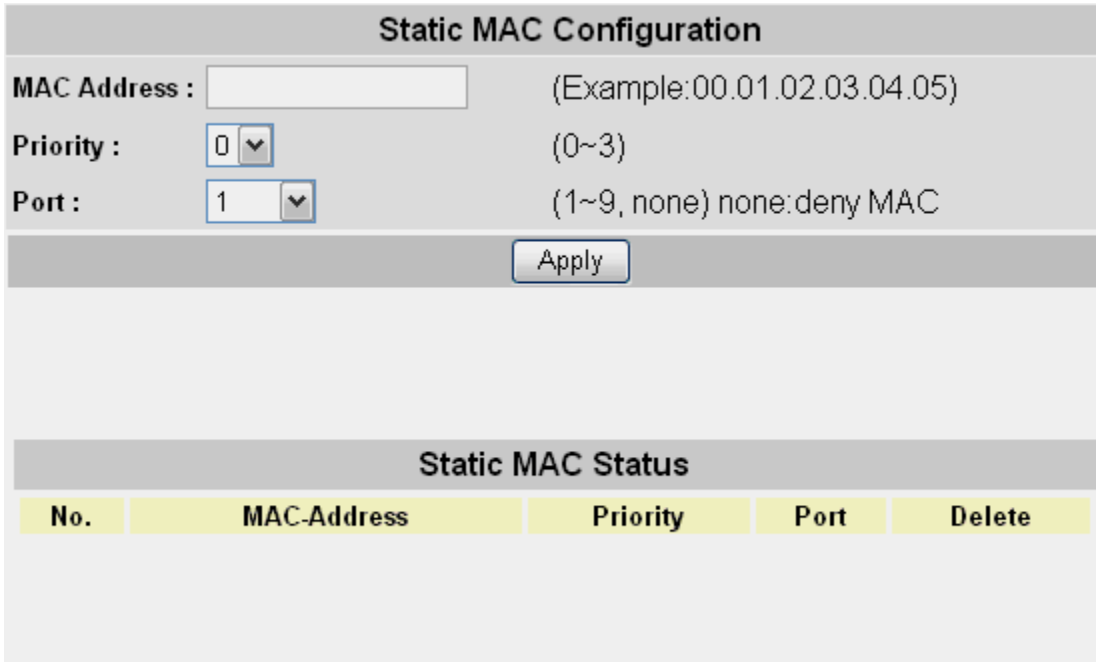
8.10.2 Lock Learning MAC

The user can stop specific port(s) from learning MAC addresses. Select the port(s) that need to be locked so that they cannot learn MAC addresses.



8.10.3 Static MAC Configuration

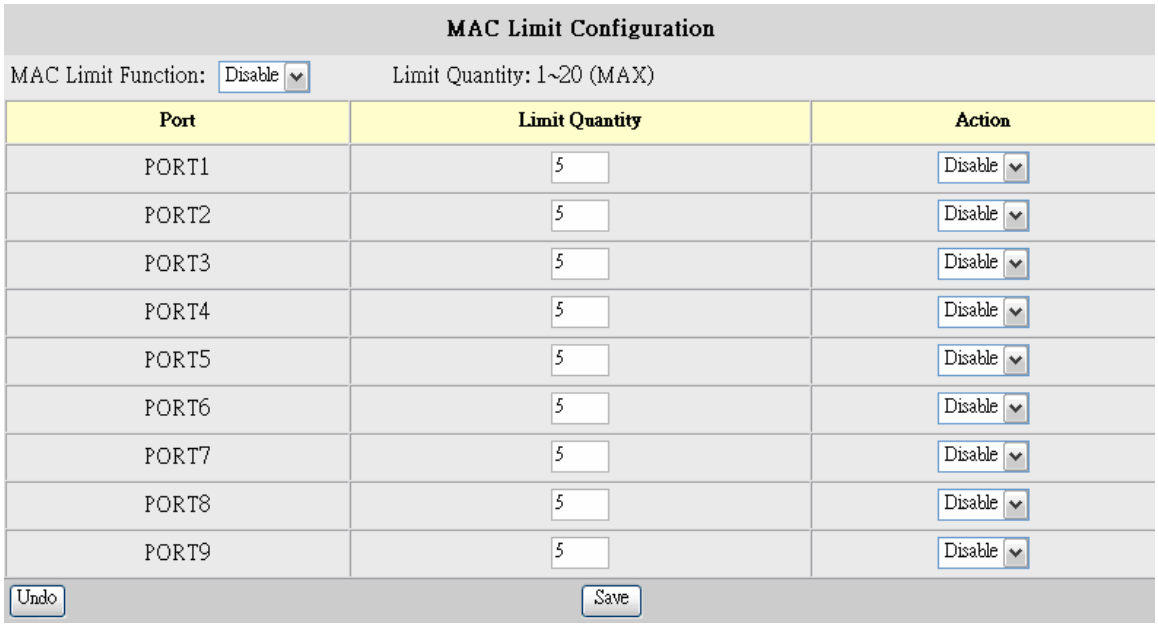
Here the user can select a static MAC configuration for certain port(s) of the Switch.



Add the valid MAC address in the MAC field, then select the priority and port number. Press “Apply” to implement the input. If you want to deny a host to access network via this switch, type in the MAC address and select “none” at port number field.

The Static MAC addresses and their settings will be displayed in the table below the input bar. Press “Delete” to void the configuration.

8.10.4 MAC Limit Configuration



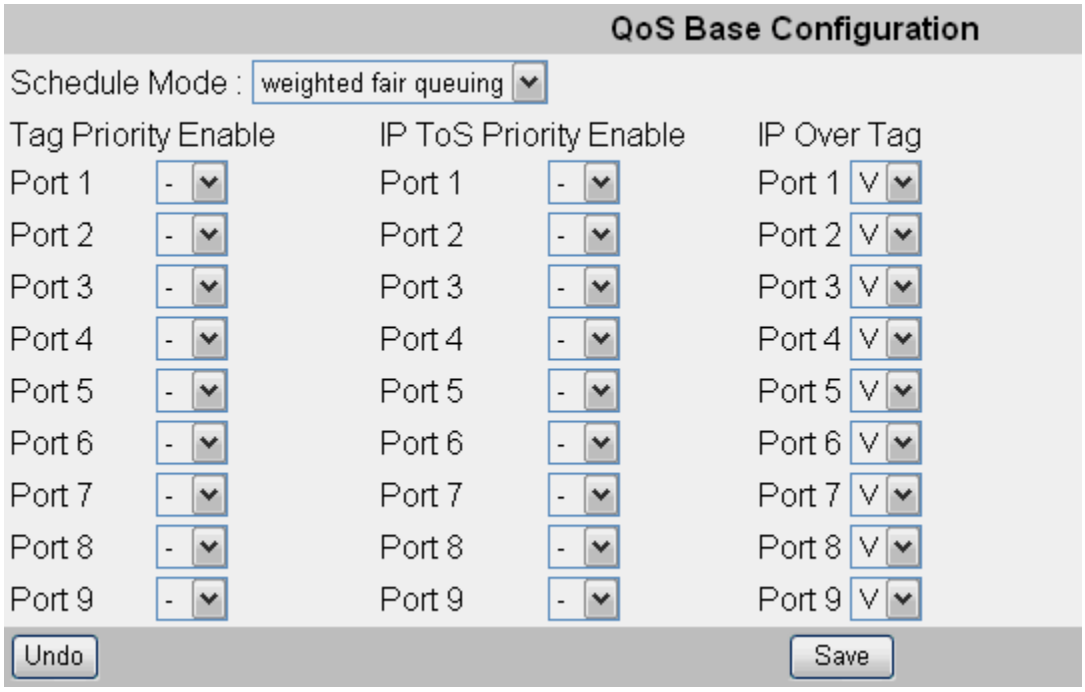
The “MAC Limit Configuration” menu lets the user limit the number of incoming MAC addresses per port. If the user wants to disable this function, select “Disable” from the combo box “Mac Limit Function” on the upper left. The Limit Quantity range is 1~20 per port. The MAC addresses learned are recorded on a per-port basis. Only the frames with such recorded MAC addresses will be forwarded. This learning process will be conducted every three minutes. So, if users change the NIC of the PC or IP appliance, the new MAC address will be learned in three minutes by the Switch, within the set quantity limitations. The MAC Limit Function can be disabled or enabled per port, under the parameter labeled “Action” in the table. Generally this function is only enabled for downlink ports.

8.11 QoS Menu

QoS (Quality of Service) refers to the mechanisms in the Switch’s network software that make the actual determinations of which packets have priority. The Switch supports advanced QoS features like scheduling, classification and policing.

8.11.1 Base Configuration

This window offers user to perform the **basic** configuration for Quality of Service.
Schedule Mode: “weighted fair queuing” or “all high before low”



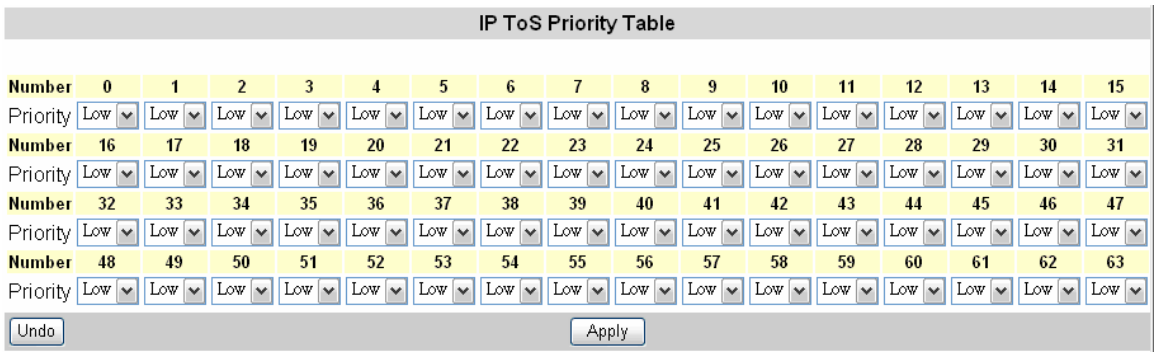
Weighted Fair Queuing (WFQ) is a packet-scheduling technique allowing guaranteed bandwidth services. The purpose of WFQ is to let several sessions share the same link. Once you adjusted the basic settings, use the “Apply” button to implement these changes.

8.11.2 Tag Priority

The user can define up to eight different priority values for the Tagged VLAN frames. Select the priority queue number for the Switch to map the MAC frames into different priority queues: i.e. High, Preferred, Normal or Low. Click “Apply” to implement the settings.

8.11.3 IP ToS Priority

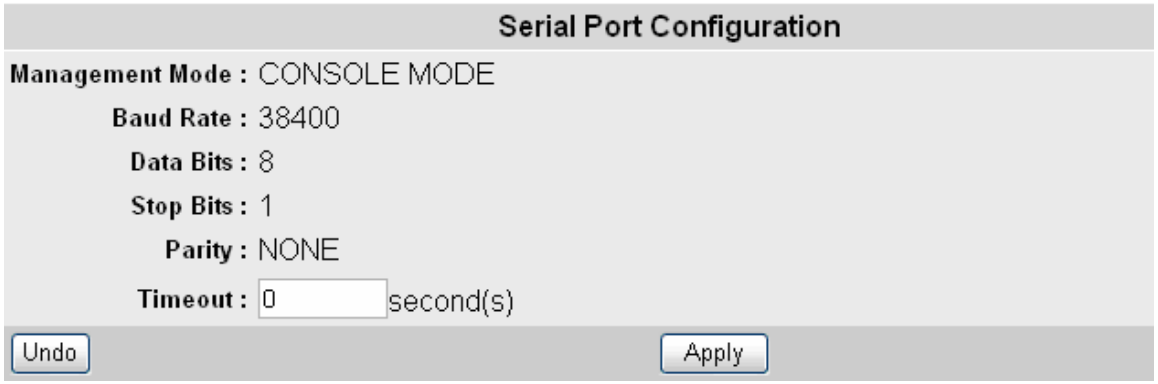
The IP ToS (Type of Service) Priority menu provides different priorities. The user can select the most suitable combination.



8.12 Management Configuration

8.12.1 Serial Port Configuration

Here the user can see the serial port configuration that can be utilized while accessing the switch via Console port.



Click on each parameter field to modify the desired setting, then click “Apply” to implement newly entered information or click “Undo” to restore previously saved configurations.

Parameter	Description
Management Mode, Baud Rate, Data Bits, Stop bits, Parity	Default COM port properties
Time Out	Set the time (seconds) for auto-logout in case there is no activity for that time period

8.13 SNMP Configuration

8.13.1 SNMP Communities

Click on each parameter field to modify the desired setting, then click “Apply” to implement newly entered information or click “Undo” to restore previously saved configurations.

Parameter	Description
GET	Read only community name, the default is “public”.
SET	Read/Write community name, the default is “private”.

Note: *You can use an external SNMP-based application to configure and manage the switch. This management method requires the SNMP agent on the switch and the SNMP Network Management Station to use the same community string. This management method, in fact, uses two community strings: the GET community string and the SET community string. If the SNMP network management station only knows the SET community string, it can read and write to the MIBs (**M**anagement **I**nformation **B**ases of the devices), but, if it only knows the GET community string, it can only read the MIBs.*

8.13.2 IP Trap Manager

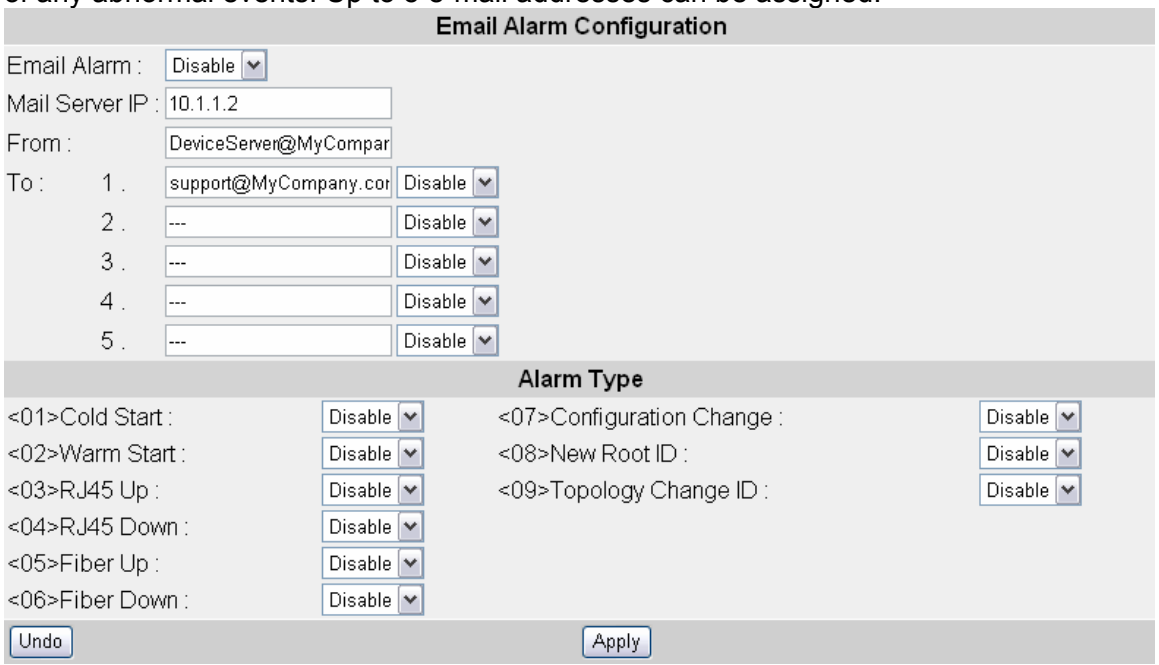
The following tables describe how to specify the management stations that will receive authentication failure messages or other trap messages from the switch. Up to 5 trap managers may be assigned.

Click on each parameter field to modify the desired setting, then click on “Apply” to implement newly entered information or click on “Undo” to restore previously saved configurations.

Parameter	Description
IP Address	Enter the IP address of special host that will be received traps.
Community Name	Enter community name.
Status	Disable or enable trap distribution.

8.14 E-mail Alarm Configuration

The Switch can send alarm notifications via e-mail to assigned e-mail addresses in case of any abnormal events. Up to 5 e-mail addresses can be assigned.



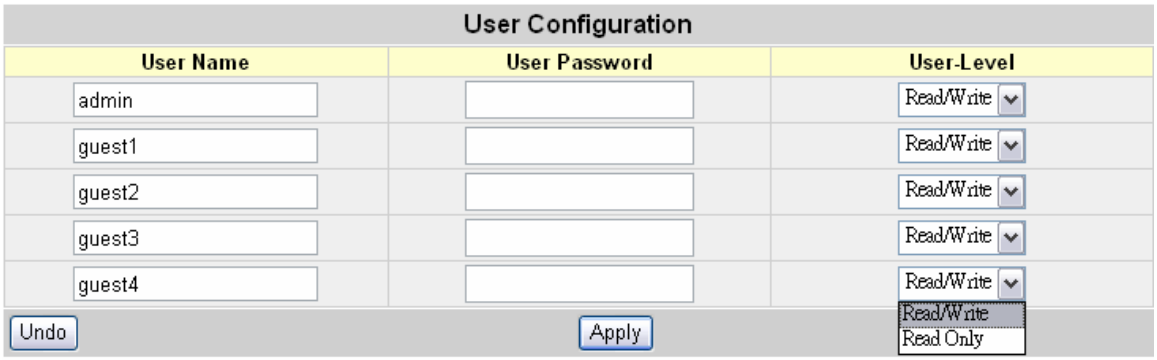
Click on each parameter field to modify the desired setting, then click on “Apply” to implement newly entered information or click on “Undo” to restore previously saved configurations.

Parameter	Description
E-mail Alarm	Enable / Disable e-mail alarm notification (Default = Disable)
Mail Server IP	Enter the IP address of the mail server
From	Valid e-mail address assigned to the Switch
To	E-mail address(es) to which e-mail will be sent (maximum of 5)
Alarm Type	Enable / Disable the type of event that should trigger an e-mail alarm

8.15 User Configuration

If this is the first time logging in to the configuration program, then the default user name is “admin” with no password. The “user level” access allows configuration to all parameters and statistics.

You should define a new administrator password, record it and put it in a safe place. Select User Configuration from the Management Setup Menu and enter a user name and/or password for the administrator. Note that passwords can consist of up to 12 and the username up to 20 alphanumeric characters – and they are not case sensitive.



Five users can be configured by the Switch.
Click on each parameter field to modify the desired setting, then click on “Apply” to implement newly entered information or click on “Undo” to restore previously saved configurations.

Parameter	Description
User Name	Modify the default Username
Password	Modify the User Password
User Level	Read/Write: Users with the user level “Read/Write” have administrator privileges and can view and change the configurations of the Switch. Read Only: Users with the user level “Read Only” can only view some configurations of the Switch.

8.16 Cable Test

Cable Test is used to diagnose the physical copper links connected each port, by separate pairs in a cable. Before the Cable Test is activated, a confirmation message “**Cable Test will disable normal network functions for one minute. Do you want to continue?**” will pop up for user’s confirmation. If the link is well-connected, the Status column will show “normal”. If the link is disconnected, the Status column will show “open”, and the Cable Length column will display the estimated distance from the port to the location where the circuit is open.

Cable Test

Port	PHY	Test	Status	CableLength	Test	Status	CableLength
1	100	pass(Rx)	normal		pass(Tx)	normal	
2	100	pass(Rx)	open	about 0M	pass(Tx)	open	about 1M
3	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 0M
4	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 1M
5	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 1M
6	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 1M
7	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 0M
8	100	pass(Rx)	open	about 1M	pass(Tx)	open	about 0M

TEST

8.17 Host Denial of Service

Host Denial-of-Service Protection

Protection: Disable

IP Address	Enable / Disable
0.0.0.0	Disable
0.0.0.0	Disable
0.0.0.0	Disable
0.0.0.0	Disable
0.0.0.0	Disable

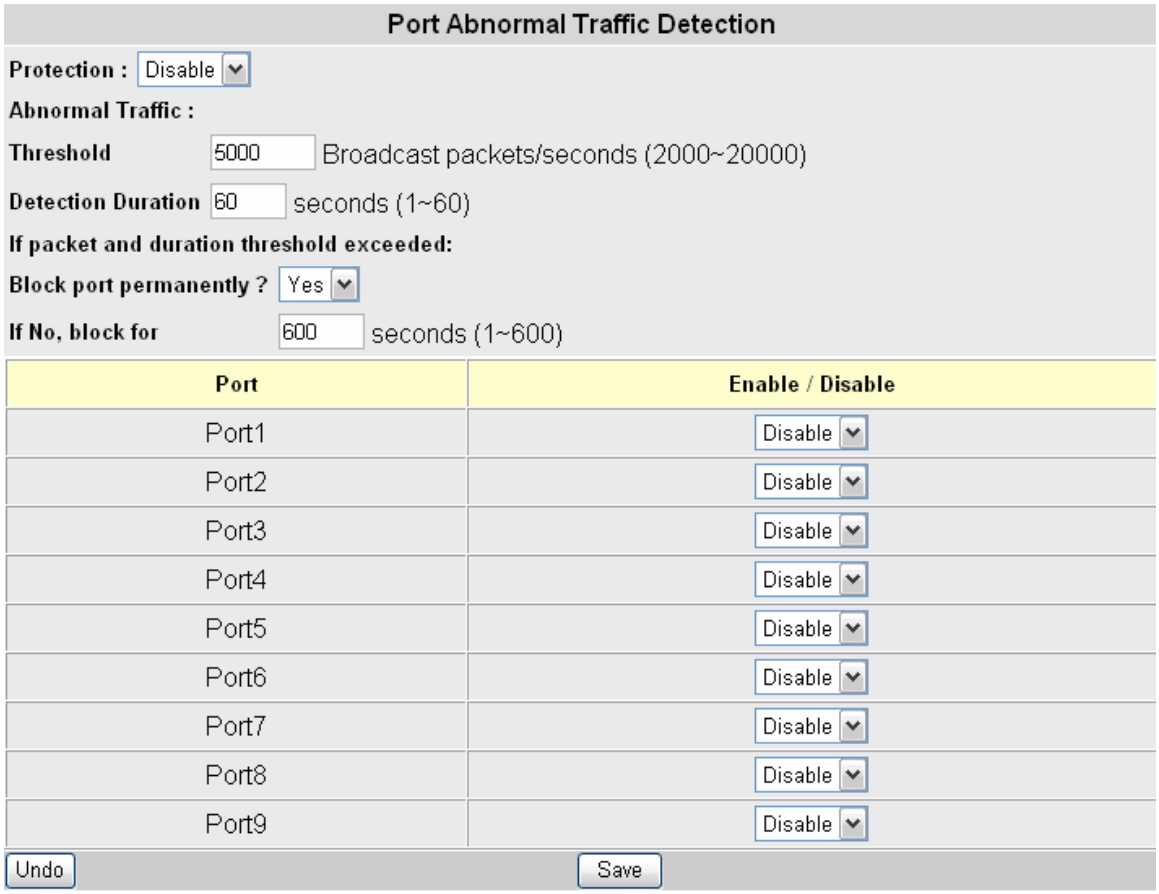
Undo Apply

This page enables the user to DENY ACCESS to the Switch's remote management interfaces to **ALL** IP addresses **EXCEPT** the maximum of five addresses that can be entered on this page.

Note: If 'Save' is activated while the 'Protection' field is enabled and all of the 'IP Address' fields are left blank or are not enabled, the Switch's remote management interfaces will become deactivated until such an act is reversed by accessing the Switch at this page or via the console port.

Start by selecting "Enable" in the "Protection" field. Then access the first "IP Address" field and type in the desired IP address and then "Enable" the field. Remember to select "Enable" here again and remember to "Apply" after the desired IP addresses have been entered. A total of five IP addresses can be selected.

8.18 Port Abnormal Traffic Detection



Here the user can alter per-port configuration to detect abnormal traffic (like broadcast traffic) and temporarily or permanently block ports that detect such traffic.

Use this page to configure all selected ports' reaction to abnormal traffic.

If, for instance, the Threshold is 5000 p/s and the Detection Duration is 60 seconds, it means that all enabled ports will be blocked if a transmission load of more than 5000 p/s is experienced on these ports for an uninterrupted period of 60 seconds.

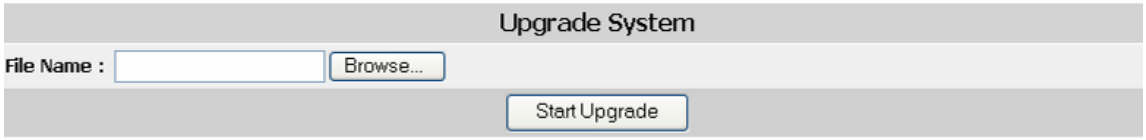
If the Block Duration is set at 600 seconds, these ports will be unblocked again after 600 seconds, but if "Block Port Permanently" is enabled, the Block Duration (600 seconds) will **not apply** and the port will be blocked forever or until the manager unblocks it by accessing the Port Settings page.

Change the above variables according to your requirements.

Enable all ports that will partake in Abnormal Traffic Detection according to the above-mentioned parameters. Click "Apply" to let changes take effect.

8.19 Firmware Download (Upgrade System)

Use the HTTP Download menu to load software updates into the permanent flash ROM in the switch. The download file should be in a binary format, otherwise, the agent will not accept it. The success of the download operation depends on the quality of the network connection. After downloading the new software, the agent will automatically restart itself. See the following figure and table:

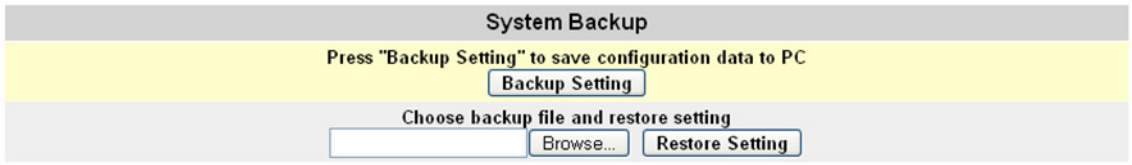


Click on "**Browse**" to select the firmware file. Once the selection is made, click "**Start Upgrade**" to upgrade the systems. The Switch will restart once the new firmware is uploaded.

Parameter	Description
File Name	Use the Browse function to find and select the firmware to be uploaded
Start Upgrade	Click here to upgrade firmware

8.20 Configuration File (System Backup)

The Switch enables the user to get a back-up of the configuration file. This will help the user to install many VOLKTEK switches with the same configurations.

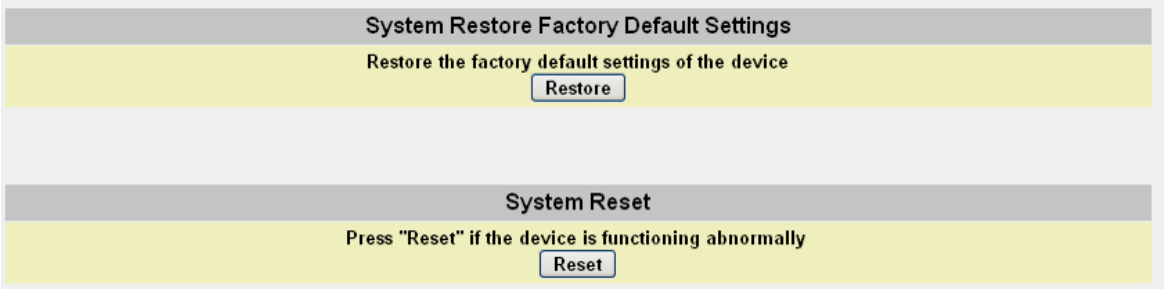


Backup settings:
Click the "Backup Setting" button and a download window for "**Config.bin**" will appear. Save the file in a safe location for later retrieval.

Restore settings:
Click on "Browse" button to select the downloaded/backed-up configuration file, and then press the "**Restore Setting**" button. The Switch will restart and apply the settings as in the configuration file.

Parameter	Description
System Backup	Use this menu to make a backup of the Switch's configurations. To begin, click on the backup setting button. Then follow the prompts to save the Switch's configurations to a designated location.
Restore Settings	Use this menu to retrieve saved files. Click the browse function to select the correct file. Then click "Restore Settings".

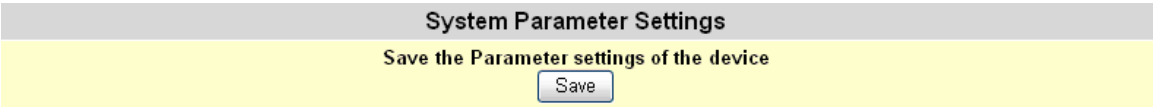
8.21 System Restart Menu – Restart Option


System Restore Factory Default Settings
Restore the factory default settings of the device
Restore
System Reset
Press "Reset" if the device is functioning abnormally
Reset

Click one of these buttons to reset/restart the system without turning OFF the power.

Parameter	Description
System Restore Factory Default Settings	⚠ Clicking on the Restore button will set the switch back to factory defaults. All saved configurations will be lost.
System Reset	Click on the Reset button to reboot the switch. After rebooting, it is necessary to log in again.

8.22 System Parameter Settings



Click “Save” button to save system configuration.

9 Command Line Interface

This section provides some basic instructions for using **Command Line Interface** to configure the Switch. The system provides CLI user interface via console or telnet.
There are five different prompts of command modes: **User**, **Enable**, **Config**, **Config-vlan** and **Config-interface**.

Mode	How to Login/Access	Prompt
User	Default login level for a valid user account.	Hostname>
Enable	Type **enable** in user mode	Hostname#
Config	Type **configure terminal** in enable mode	Hostname(config)#
Config-vlan	Type **vlan** <1~4094> in config mode	Hostname(config-vlan)#
Config-interface	Type **Interface port-channel** < port-list > in config mode	Hostname(config-interface)#

For detail command lists, please reference to appendix B.

9.1 Log in

When you connect the system via CLI, the system will prompt you to enter a valid user name and password. The default log-in name is “admin” with no preset password.

The user mode is the default login level for a valid user account. After you log in, type in “?” or “help” followed by “Enter” key to display a full list of usable commands with explanations of their functions.

```
NSH-5009> help
Commands available:
  enable                  Turn on privileged commands
  exit                    Exit from current mode
  help                    Show available commands
  history                 Show a list of previously run commands
  logout                  Disconnect
  ping                    Ping a specified host with IP address
  show ip                 Show network configuration
  show system-information  Show system configuration
```

The table above lists and explains all the available commands. Users can refer to the table when configuring the Switch management agent.
Type in “enable” followed by “Enter” key to access the “Enable mode”. To access enable mode, you need a read/write privilege level user account.

9.2 Show commands

Where appropriate, a status report can be shown by typing “show” followed by the parameter name.
Type “show” and press Enter to display a full list of configuration commands:

```
NSH-5009# show
  abnormal              Show abnormal traffic detection configuration
  cable                 Show cable test results
  hdos                  Show Host Denial-of-Service configuration
  email-alarm           Show email configuration
  frame                 Show switch frame
  igmp                  Show switch IGMP
  interface             Show port configuration
  ip                    Show network configuration
  locked-mac            Show Lock prevent unknown MAC configuration
  logins                Show login account information
  loop                  Show loop detection configuration
  mac                   Show switch MAC
  mac-limit             Show MAC limit configuration
  mirror                Show mirror configuration
  qos                   Show QoS configuration
  rate_control          Show rate control configuration
  rmon                  Show RMON information
  rstp                  Show RSTP configuration
  snmp                  Show SNMP configuration
  static-mac            Show static unicast MAC configuration
  system-information    Show system configuration
  trunk                 Show trunk configuration
  version               Show system version
  vlan                  Show VLAN configuration
  xpress                Show Xpress Ring configuration
```

9.3 System configurations

Type “configure terminal” in enable mode to access the configuration mode.

```
NSH-5009# configure terminal
NSH-5009(config)#
```

You can type in “?” or “help” followed by “Enter” key to display a full list of help commands with explanations of their functions. For detail command lists, please reference to appendix B.

9.3.1 Port configurations

Change the configuration mode to configure parameters of switch ports with the following command:

```
NSH-5009(config)# interface port-channel <port-list>
```

For example, use this command to access port 1.

```
NSH-5009(config)# interface port-channel 1
NSH-5009(config-interface)#
```

Then, you can type in “?” or “help” followed by “Enter” key to display a full list of help commands with explanations of their functions.

9.3.2 Spanning Tree Protocol (STP) configurations

STP allows the Switch to assign a priority status on the Switch with respect to other networking nodes in the network. Ensure that this function is activated when setting up backup links and to avoid loop.

Type a question mark “?” after spanning-tree command to display a full list of help commands with explanations.

```
NSH-5009(config)# spanning-tree
  enable                Enable RSTP on the switch
  force-version         Set RSTP force version
  forward-delay         Set RSTP forward delay
  hello-time            Set RSTP hello time
  max-age               Set RSTP max age
  priority              Set RSTP switch priority
```

9.3.3 Virtual LAN configurations

Before you configure VLAN parameters, you should setup the VLAN type to “Tag-Based”. For example, use the following commands to setup tag-based VLANs:

```
NSH-5009(config)# vlan-type 802.1q
NSH-5009(config)# vlan 1
NSH-5009(config-vlan)#
```

Type a question mark “?” or “help” followed by Enter to display a full list of help commands with explanations.

```
NSH-5009(config-vlan)# help
Commands available:
  exit                  Exit from current mode
  help                  Show available commands
  history               Show a list of previously run commands
  logout                Disconnect
  ping                  Ping a specified host with IP address
  manage                This VLAN Group ID is a management VLAN
  member                Specify the port(s) you don't want to
                         modify all outgoing frames transmitted
                         with this VLAN Group ID
  non-member            Specify the port(s) don't a member for
                         this VLAN Group ID
  tagging               Specify the port(s) you want to tag all
                         outgoing frames transmitted with this VLAN
                         Group ID
  untagging             Specify the port(s) you don't want to tag
```

```
                          all outgoing frames transmitted with this
                          VLAN Group ID
```

9.3.4 SNMP configurations

Changing or setting SNMP parameters to accommodate the network management systems as needed.
Type a question mark “?” after snmp command to display a full list of help commands with explanations.

```
NSH-5009(config)# snmp
  contact               Set system contact name
  getcommunity          Set GET community
  location              Set system location
  name                  Set system name
  setcommunity          Set SET community
  trapcommunity         Set TRAP community
  trapenable            Set TRAP enable
  trapip                Set TRAP IP address
```

10 Troubleshooting

The network administrator can observe and monitor most areas of the Switch status using the LED indicators on the front panel to quickly identify problems. This section contains a few of the more common problems that may arise and possible solutions.

Symptom: Power indicator does not light up after power on.
Cause: Defective power outlet or power cord.
Solution: Verify if the power outlet is functioning normally by plugging in another properly operating device. Connect the power cord to another device to test. If these two tests fail to resolve the problem, replace the power supply unit.

Symptom: Link indicator does not light up after making a connection.
Cause: Network cable or fiber/copper port is defective.
Solution: Ensure that the attached device and Switch are powered on. Verify that the fiber and/or copper cable has been properly connected to both devices. Make sure that the cabling distance does not exceed specified limits. Inspect cable for defects and replace if necessary.

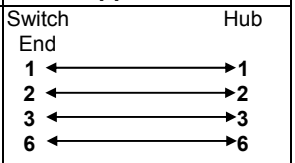
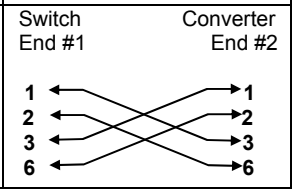
Symptom: Unit powers off during operation after a period of time.
Cause: Loose power connections, power surges/loss or unavailability of redundant power.
Solution: Ensure that all power connections are secure and that the unit fans have proper ventilation. If unable to correct the problem by above measures, it may be necessary to replace internal power supply unit.

11 Appendix A

11.1 RJ-45 Cables

When connecting your network devices, use a standard Category 3 eight-way cable for a 10Base-T configuration and a Category 5 cable for 100Base-TX. The pin assignments are as follows:

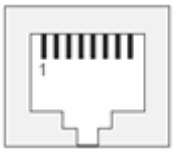
Pin	**1**	**TD+**	**Pair**	**2**	**White/Orange**
Pin	**2**	**TD-**	**Pair**	**2**	**Orange/White**
Pin	**3**	**RX+**	**Pair**	**3**	**White/Green**
Pin	**4**	**N/A**	**Pair**	**1**	**Blue/White**
Pin	**5**	**N/A**	**Pair**	**1**	**White/Blue**
Pin	**6**	**RX-**	**Pair**	**3**	**Green/White**
Pin	**7**	**N/A**	**Pair**	**4**	**Brown/White**
Pin	**8**	**N/A**	**Pair**	**4**	**Brown/White**

Application	Cable Type	Application
Switch to Switch or Network Adapter	Straight-through Cable	
Converter to Switch	Cross-Over Cable	

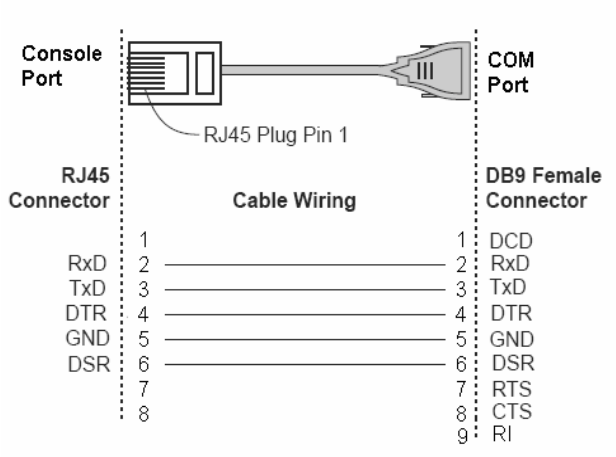
Remark:
The Switch features automatic MDI/MDI-X and NWay on RJ-45 ports.

11.2 Console Cable (RJ-45 to DB-9)

When connecting your Switch's console port to your COM port, use the provided console cable. The pin assignments are as follows.



RJ-45 pin assignment



RJ-45 (8-pin) to DB9 (F) pin assignment

11.3 SNMP Trap List

1. Switch Traps Group (private)
   - Cold start
   - Warm start
   - Link up
   - Link down
   - System configuration change

2. MIB-II Traps
   - Cold start
   - Warm start
   - Link up
   - Link down
   - Authentication failure

12 Appendix B

Command Summary

12.1 Command Mode Summary

Mode	How to Login/Access	Prompt
User	Default login level for a read-only account.	Hostname>
Enable	Type **enable** in User mode	Hostname#
Config	Type **configure terminal** in Enable mode	Hostname(config)#
Config-vlan	Type **vlan** <1~4094> in Config mode	Hostname(config-vlan)#
Config-interface	Type **interface port-channel** < port-list> in Config mode	Hostname(config-interface)#

12.2 Command Summary: User Mode (read privilege)

Command			Description
enable			Turn on privileged commands
exit			Exit from current mode
help			Show available commands
history			Show a list of previously run commands
logout			Disconnect
ping	<ip-address>		Ping a specified host with IP address
show	ip		Show network configuration
	system-information		Show system configuration

12.3 Command Summary: Enable Mode (read/write privilege)

Command			Description
configure	terminal		Enter configuration mode
copy	config	tftp <ip> <filename>	Download config image from switch
	firmware	tftp <ip> <filename>	Download firmware image from switch
	tftp	command-text <ip> <filename>	Upgrade config by command-text file from tftp server
	tftp	config <ip> <filename>	Upgrade config image from tftp server

	tftp	firmware <ip> <filename>	Upgrade firmware image from tftp server
disable			Turn off privileged commands
enable			Turn on privileged commands
exit			Exit from current mode
help			Show available commands
history			Show a list of previously run commands
ping	<ip-address>		Ping a specified host with IP address
logout			Disconnect
reset	default		Reset configuration to the factory default settings
	system		Restart the system
show	abnormal		Show abnormal traffic detection configuration
	cable	all	Show cable test results of all ports
		port	Show cable test results of individual port
	hdos		Show Host Denial-of-Service configuration
	email-alarm		Show email configuration
	frame		Show switch frame
	igmp		Show switch IGMP
	interface		Show port configuration
	ip		Show network configuration
	locked-mac		Show lock prevent unknown MAC configuration
	logins		Show login account information
	loop		Show loop detection configuration
	mac		Show switch MAC
	mac-limit		Show MAC limit configuration
	mirror		Show mirror configuration
	qos	schedule	Show QoS schedule
		tag-enable	Show QoS tag
		ip-enable	Show QoS ip-priority
		ip-over-tag	Show QoS ip-over-tag
		tag-pri	Show QoS tag-pri
		ip-tos-pri	Show QoS ip-tos-pri

	rate_control			Show rate control configuration
	rmon			Show RMON information
	rstp			Show RSTP configuration
	snmp			Show SNMP configuration
	static-mac			Show static unicast MAC configuration
	system-information			Show system configuration
	trunk			Show trunk configuration
	version			Show system version
	vlan	type		Show VLAN type
		port-base		Show port-based VLAN configuration
		tag-base	management-vlan	Show tag-based VLAN management-VLAN
			port-info	Show tag-based VLAN port-info
			vlan-id	Show tag-based VLAN VLAN-id
			vlan-table	Show tag-based VLAN VLAN-table
	xpress			Show Xpress Ring configuration
write	memory			Save configuration

12.4 Command Summary: Configuration Mode (read/write privilege)

Command			**Description**
exit			Exit from current mode
help			Show available commands
history			Show a list of previously run commands
logout			Disconnect
ping	<ip-address>		Ping a specified host with IP address
abnormal			Set abnormal traffic detection configuration
	detection	<enable|disable>	Enable/Disable abnormal traffic detection
	duration	<1-60>	Detection Duration in seconds
	interval	<1-600>	Set Protection interval in seconds
	permanently	<yes|no>	Block port permanently? <yes/no>
	threshold	<200-20000>	Set Threshold of traffic detection(pkts/sec)
dhcp			Set this system to be a DHCP client or not

	disable		DHCP disable
	enable		DHCP enable
hdos			Set Host Denial-of-Service configuration
	ip	<index> <ip address>	Set acceptable ip for HDoS protection (index:1-5)
	ip-enable	<index> <enable|disable>	Enable/Disable individual ip for HDoS protection (index:1-5)
	protection	<enable|disable>	Enable/Disable Host Denial-of-Service protection
email-alarm			Set email alarm configuration
	disable		Disable email alarm
	enable		Enable email alarm
	from	<string>	Set “email from” [string]
	server	<ip-string>	Set “email server” [IPstring]
	to	<id> <string> <enable|disable>	Set “email to” [id] [string] [enable|disable]
	type		Set email alarm type
gateway			Set gateway
igmp			Set IGMP
	query-mode	<auto|enable|disable>	Set IGMP query mode
	snooping	<enable|disable>	Set IGMP snooping
	static	<port-list>	Set IGMP static port
interface	port-channel	<port-list>	Enter interface configuration mode
ip	<ip address>		Set the IP Address
lacp			Set LACP
	group	<group#> <lacp|static>	Set LACP or static trunk group
	port	<port#> <active|passive>	Set LACP port state active or passive
	priority	<0-65535>	Set system priority for LACP
	restart		Store LACP configurations and restart
logins			Modify login account
loop	detection	disable	Disable loop Detection
		enable	Enable loop Detection
	mac	<MAC address>	Set loop detection test frame MAC address
	port	<id> <enable|disable>	Enable/Disable individual port loop detection
mac-limit	<enable|disable>		Set MAC limit configuration
mirror	mode	<egress|all|disable>	Set mirror mode

	monitoring-port	<port id>	Set mirror monitoring-port
netmask	<netmask>		Set netmask
no	gateway		Set gateway to factory default
	igmp	snooping	Disable IGMP snooping
		static	Disable IGMP static port
	ip		Set IP address to factory default
	lacp		Disable LACP on the switch
	logins		Reset login password to NULL
	netmask		Set netmask to factory default
	spanning-tree		Disable spanning tree
	trunk	<group-id>	Disable trunk group
	vlan	<vlan-id>	Delete static VLAN entry
	xpress-ring		Disable Xpress Ring
qos	schedule	all-high-before-low	Set QoS schedule all-high-before-low
		weighted-fair	Set QoS schedule weighted-fair
	ip-enable	<port id> <enable|disable>	Set QoS ip-enable
	ip-over-tag	<port id> <enable|disable>	Set QoS ip-over-tag
	ip-tos-pri	<0-63> <low|normal|preferred|high>	Set QoS ip-tos-pri
	tag-enable		Set QoS tag-enable
	tag-pri	<0-7> <low|normal|preferred|high>	Set QoS tag-pri
rmon	clear		Clear RMON information
snmp	contact	<contact name>	Set system contact name
	getcommunity	<Community Name>	Set GET community
	location	<location name>	Set system location
	name	<snmp name>	Set system name
	setcommunity	<Community Name>	Set SET community
	trapcommunity	<index> <Community string>	Set TRAP community
	trapenable	<index> <enable|disable>	Set TRAP enable
	trapip	<index> <IP address>	Set TRAP IP address
spanning-tree	enable		Enable RSTP on the switch

	force-version	<rstp|stp>	Set RSTP force version
	forward-delay	<4-30>, default:15	Set RSTP forward delay
	hello-time	<1-10>, default:2	Set RSTP hello time
	max-age	<6-40>, default:20	Set RSTP max age
	priority	<0-65535>, default:32768	Set RSTP switch priority
static-mac	add	<xx.xx.xx.xx.xx.xx> priority <0-3> port <1-10> ...	Add static unicast MAC configuration
	delete	<xx.xx.xx.xx.xx.xx>	Delete static unicast MAC configuration
trunk	<group number> member <port num> <port num> <port num> ...		Set trunk control configuration
vlan	<1-4094>		Enter tag-based VLAN configuration
vlan-type	disable		Disable VLAN
	port-base		Enable port-based VLAN
	802.1q		Enable 802.1q VLAN(tag-based VLAN)
xpress-ring	enable		Enable Xpress Ring
	port-1	<port-id>	Set Xpress Ring port-1
	port-2	<port-id>	Set Xpress Ring port-2
	role	<forward|arbiter>	Set Xpress Ring role

12.5 Command Summary: Interface Mode (read/write privilege)

Command			Description
exit			Exit from current mode
help			Show available commands
history			Show a list of previously run commands
abnormal-enable			Enable individual port detection
bandwidth-limit	ingress-mode	<floodedunicast-multicast-broadcast|multicast-Broadcast|broadcast|all>	Set ingress-mode
	ingress	<nolimit|128K|256K|512K|1M|2M|4M|8M|16M|32M|64M>	Set ingress rate (up to 64M)
	egress	<nolimit|128K|256K|512K|1M|2M|4M|8M|16M|32M|64M>	Set egress rate (up to 64M)

default-priority	<0-7>		Set default ingress priority to use when no priority information available
double-tag			Always add a tag in the egress frames
egress-set	<port-list>		Set outgoing traffic port list for a port-based VLAN
flow-control			Enable interface flow control
frame-type	<fallback|check|secure>		<fallback> accept incoming frames(nonmember forward/untag forward)
			<check> accept incoming frames(nonmember drop/untag forward)
			<secure> accept incoming frames(nonmember drop/untag drop)
inactive			Disable specified port(s) on the switch
auto-negotiation			Enable autonegotiation of specified port(s)
isolate			Isolate ports belonging to the same VLAN do not communicate with each other
lock-mac			Set Lock MAC configuration for the port(s)
mac-limit	action	<enable|disable>	Enable/Disable MAC limit for the port(s)
	quantity	<1-20>	Set MAC limit quantity for the port(s)
mirror			Enable port mirroring in the interface
name			Set a name for the port(s)
no	abnormal		Disable individual port detection
	bandwidth-limit	egress	Disable egress bandwidth control
		ingress	Disable ingress bandwidth control
		ingress-mode	Clear ingress bandwidth control mode
	double-tag		Disable double-tag in the egress frames
	egress-set		Disable the outgoing traffic port list for a port-based VLAN
	flow-control		Disable flow control on the interface
	auto-negotiation		Disable auto-negotiation of specified port(s)
	inactive		Enable port(s) on the switch
	isolate		Disable port isolate on the interface
	mirror		Disable port mirroring in the interface
pvid	<1-4094>		Set a PVID for the specified interface (range:1~4094)
rstp-active	<on|off>		Set RSTP port active
rstp-edge	<on|off>		Set RSTP port edge
rstp-p2p	<auto|on|off>		Set RSTP port p2p
rstp-path-	<0-65535>		Set RSTP port path cost

cost			
rstp-priority	<0-255>		Set RSTP port priority
speed-duplex	<10f|10h|100f|100h|1000f>		Set duplex and speed mode

12.6 Command Summary: VLAN (802.1q) Mode (read/write privilege)

Command			Description
exit			Exit from current mode
help			Show available commands
history			Show a list of previously run commands
logout			Disconnect
ping	<ip-address>		Ping a specified host with IP address
manage			This VLAN Group ID is a management VLAN
member	<port-list>		Specify the port(s) you don't want to modify all outgoing frames transmitted with this VLAN Group ID
non-member	<port-list>		Specify the port(s) don't a member for this VLAN Group ID
tagging	<port-list>		Specify the port(s) you want to tag all outgoing frame transmitted with this VLAN Group ID
untagging	<port-list>		Specify the port(s) you don't want to tag all outgoing frames transmitted with this VLAN Group ID

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